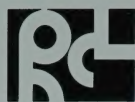


# '92 CATALOG

# TOKO



# In Japan and Abroad, More and More Customers Rely on TOKO.



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Specifications of products in this catalog are subject to change without notice. It is requested that confirmation is made when ordering.

本カタログは、製品の改善などによって、記載内容を予告なく変更することがありますのでご了承下さい。

なお、ご注文に際しては、仕様・承認図などの取り交わしをお願いします。

☼：本製品はココム製品です。輸出に関しては、通商産業省の事前の許可が必要です。詳細はお問い合わせください。

## Uses of Toko's Products 東光商品 用途別一覧

	Coils & filters	Giga-Hz range filters	Ceramic filters	Oscillating elements	Variable capacitance diodes	ICs for communications equipment	General purpose ICs	HF hybrid modules	Pulse transformers	Delay lines	Switches	DC/DC converters	Switching power supplies	Video frame memories	NC boards
<b>Television Equipment</b>															
High-definition TV	●			●						●	●		●	●	
Small TV sets	●						●				●				
BS tuners	●	●		●							●		●		
VCR/VTR	●			●	●		●			●	●		●		
Video movies	●			●			●	●			●	●	●		
Video disk players	●			●	●		●				●		●		
Electronic still cameras	●			●			●	●				●	●		
<b>Audio Equipment</b>															
Radio sets	●		●		●		●								
Car audio systems	●		●		●		●	●			●	●			
Tape recorders	●														
CD players	●			●	●			●	●						
Stereo components	●		●		●		●				●				
Head-phone stereos	●				●		●								
<b>Household Equipment</b>	●			●							●		●		
<b>Radio Communicators</b>															
Cordless phones	●	●		●	●	●	●	●			●		●		
Pagers	●	●		●	●	●	●	●							
Car radiophones	●	●		●		●	●	●			●				
<b>Wire Communicators</b>															
Telephones	●			●					●		●				
FAX	●			●					●	●	●		●		
LAN				●					●				●		
<b>Measuring Instruments</b>				●	●		●			●	●	●	●		
<b>Computers</b>															
Lap-top PC				●						●		●	●		
HDD/OMDD				●	●		●			●	●	●	●		
Laser beam printers										●	●		●		
<b>Ultrasonic medical equipment</b>					●					●	●		●		
Image processors	●								●	●	●		●	●	
Industrial machines				●			●	●			●		●		●
Office equipment				●			●						●		

**Products for Surface Mounting Technology** 東光の表面実装対応品一覧

Item	Type Name	Use	Description	Dimensions, mm W × D × H	Soldering Process	Packaging	Page		
Coils	43CS	General purpose	Fixed	4.5 × 3.2 × 3.5	Dip or reflow	Tape or tray	7		
	43FS			4.5 × 3.2 × 3.5					
	5CA	Bias OSC		6.6 × 5.8 × 4.0					
	10RF	DC choke		10 × 11 × 5.5					
	12RF			12 × 13 × 6.5					
	B5F	DMB. splitter		6.9 × 6.9 × 5		9			
	5CBL	Card type radio & Comm. equip.	Adjustable	4.6 × 4.2 × 2.1	Reflow	Tape or tray	7		
	5CDL			5.3 × 5.3 × 2.2					
	5CBG			5.2 × 5.2 × 4.6					
	5CCL			6.0 × 5.7 × 5.0					
	5CCD			6.0 × 5.7 × 5.5					
	5CCA			6.0 × 5.7 × 6.0					
	5CE			6.3 × 6.1 × 5.6					
	MC152			5.1 × 5.1 × 5.5					
	MC153			11.4 × 5.0 × 5.0					6
LC Filters	4FUS	Video	Fixed	5.2 × 5.2 × 5.1	Reflow	Tape or tray	10		
	4FS			5.2 × 5.2 × 5.1			11		
	4FW			10 × 5.2 × 5.1			12		
	4FT			14.9 × 5.2 × 5.1			13		
	4FNS			5.5 × 5.5 × 5.1			10		
	4FNW		Fixed or adjustable				11.3 × 5.5 × 5.1	12	
	4FNT						16.9 × 5.5 × 5.1	13	
	4FJS						5.2 × 5.2 × 3.9	10	
	4FJW						10 × 5.2 × 3.9	11	
	4FJT						14.9 × 5.2 × 3.9	13	
	5FS	Audio	Adjustable	5.6 × 5.6 × 8.0			11		
Helical Filters	5CHLW	Comm. equip.	Adjustable & Fixed	11.0 × 6.0 × 4.5	Reflow	Tape	19		
	5CHW			11.5 × 6.0 × 6.3					
	5CHT			17.3 × 6.0 × 6.3					
Diodes (Var. cap)	KV1562M	AM audio	AM: 8V, 4 sect, miniflat	MFP-8	Reflow	Tape	21		
	KV1563M		AM: 8V, 3 sect, miniflat						
	KV1530	AM, comm. equip.	AM: 8V, VFO control	SOT-23					
	KV1550	AM audio	AM: 4.5V, 2 sect., 1 chip	SOT-23L					
	KV1560		AM: 8V, 2 sect., 1 chip						
	KV1580		AM: 6.5V, 2 sect.						
	KV1581	FM, comm. equip	AM: 6.5V, single	SOT-23			22		
	KV1410		FM: 8V, minimold, twin						
	KV1420		FM: 25V, minimold, twin						
	KV1430		FM: 9V, minimold, twin						
	KV1440		FM: 8V, minimold, twin						
	KV1450		FM: 9V, wideband, minimold						
	KV1470	VCO	FM: 5V, wideband, minimold						
	KV1812		UHF: 8V single						
	KV1821		UHF: 25V single						
KV1832	UHF: 4V single								
ICs	TK11821M	Audio, comm. equip.	DC-DC converter	MFP-8	Reflow	Tape	31		
	TK11806M	AV, comm. equip.					30		
	TK10502M	Video, comm. equip.							
	TK10503M						Motor control		
	TK10681M	AV, comm. equip.	Local regulator, L level	SOT-23L			29		
	TK10682M		Local regulator, H level						
	TK11701M		Programmable regulator						
	TK114□□M		Local regulator	MFP-8			28		
	TK115□□M		1V regulator						
	TK10446M								
	TK10420M	Comm. equip.	Narrow band FM receiving system	MFP-20			24		
	TK10421M								
	TK10485M		High sensitivity narrow band receiving system						
	TK10486M								
	TK10487M								

continued on next page

Item	Type Name	Use	Description	Dimensions, mm W × D × H	Soldering Process	Packaging	Page
ICs	TK10440M	Comm. equip.	FM-IF System IC's for Pager	MFP-20	Reflow	Tape	24
	TK10440V			VSOP-20			
	TK10445M			MFP-20			
	TK10445V			VSOP-20			
	TK10447M			MFP-20			
	TK10447V			VSOP-20			
	TK10650M		Compandor	MFP-20			26
	TK10651M			MFP-28			
	TK10652M			VSOP-24			
	TK10654M			MFP-20			
	TK10654V			QFP-52			
	TK10655M			FM-IF + Compandor			
	TK10752Q	MFP-8					
	TK15120M	AV, comm. equip.	2 cct audio muting use	33			
	TK15067M	Video, comm. equip.	Analog switch				
	TK10840M	AV	TV multiplex sound			Tape	
	TK10850M	Audio	Graphic equalizer				MFP-20
TK10581M	MFP-28						
TK10585M	MFP-30						
TK10590M	QFP-60						
KM3702AQ	FA			LSI for Numerical control	Tray		
Delay Lines	RMT020L	OA/FA	Built-in TTL 5 outputs	13.0 × 13.0 × 4.9	Reflow	Cartridge (Stick)	51
	RMT025L						
	RMT050L						
	RMT075L						
	RMT100L						
	RMT150L						
	RMT200L						
	RST020A		Low-profile design	12.2 × 7.3 × 4		Tape or Cartridge	52
	RST030A						
	RST040A						
	RST050A						
	RST020C						
	RST030C						
	RST040C						
	RST050C						
Pulse Transformers	Q20RTS8-1EQ	LAN	Four windings are available for use	12 × 9.6 × 6.0	Dip or Reflow	Cartridge	37
	Q20RTS8-2EQ						
	Q20RTS15-1EQ						
	Q20RTS15-2EQ						
Switch	KSC	General purpose	Gull. J Wing type 160.300gf	6.2 × 6.2 × 2.7	Dip or Reflow	Tape	37

Small Coil Applications 小形コイル 用途別一覧

			SUBMINI ADJ. TYPE	ADJUSTABLE COILS						FIXED IFTs	MOLDED COILS	FOR TAPE RECORDERS	FIXED COILS	FIXED COILS FOR SMT			
			4 P P S S	4 K P S A K M	7 P P L S 7 P P B	7 K K L M S 7 K K L B S	7 P T A S 7 P T L A	10 E Z	10 P A	10 K	7 P P S U	MC110 MC117 MC119 MC120 MC134 MC136 MC137 MC138	MC139 MC141 MC152 MC153	10YS 10VXA 15RSL			
RADIO & STEREO	ANT T R F O S C	LW														<ul style="list-style-type: none"><li>• for Dip-solder 43CS</li><li>• for Reflow-Solder 43CS 10RB 43FS 5CA</li><li>• for Magnetic Shield</li><li>• for Reflow-Solder 5CCL 5CCD 5CCA 5CDL 5CBG 5CBL 5CE 5F</li><li>• for Molded Coil MC152 MC153</li><li>• Others B5F</li></ul>	
		MW															
		SW 1															
		SW 2															
		SW 3															
	I F T	VHF															
		262.5kHz															
		455kHz															
		10.7MHz															
		M P X	19kHz														
38kHz																	
LEAK FILTER																	
SCA FILTER																	
R E T R O F E E D	OSC COIL																
	TRAP COIL																
TV & VTR	V I F	VIFT															
		VDET															
		ADJ. CHAN. TRAP SOUND TRAP, ETC.															
		SIFT															
		SOUND DET.															
	S I F	TRAP COIL															
		BANDPASS BURST AMP 3.58MHz TRAP, ETC.															
		INPUT TUNING DET															
		H. STAB. COIL															
		VTR															





PRECAUTIONS FOR USE












- Products, when stored, should be kept in an environment free from high temperature, high humidity, dust and corrosive gases.
  - Rough handling of products must be avoided.
  - Direct handling of terminals (pins) must be avoided to prevent solder defects.
  - Do not bend the terminals.
  - Coils may be damaged when rinsing fluids are used for flux removal and should not be applied.
- When cleaning is necessary, please consult your sales rep.
- Care should be taken in design and in production that the adjustable core does not become fixed due to solder flux.
  - In the set design, care must be taken with regard to spurious signal generation, especially when using ceramic filters.












ご使用上の注意

- 製品の保管の際には、高温・多湿・塵埃・有毒ガスのないようにして下さい。
- 製品の落下や乱雑な取り扱い、破壊またはトルク変化を生ずる恐れがありますのでご注意ください。
- はんだ付け性の劣化原因となりますので、電極(はんだ付け端子)に直接手で触れないで下さい。
- 端子は折り曲げないで下さい。
- コイルが、フラックスなどの洗浄液により著しく損なわれる場合がありますので洗浄しないで下さい。特に洗浄が必要な場合は、ご相談下さい。
- 調整磁心が、はんだ付けフラックスにより固定されないように、設計や生産時に配慮下さい。
- セットの設計の際に、スプリアス特性にご注意下さい。  
(特にセラミックフィルタの場合)

Coils for Radio, TV & Stereo Sets 可変コイル

Specifications	Freq. Range	L Range	Q (Typ.)	Int. cap. on option;
Type	kHz kHz MHz MHz MHz	10 100 1 10 100		
4P  (5.1 × 5.1 × 4.5mm) Max.		1μH ~ 700μH	80	None
4K  (5.1 × 5.1 × 4.5mm) Max.		0.02μH ~ 1μH	60 at 100MHz	None
Specifications	Freq. Range	L Range	Q (Typ.)	Int. cap. on option;
Type	kHz kHz MHz MHz MHz	10 100 1 10 100		
5P  (6 × 6 × 6.2mm) Max.		1μH ~ 680μH	75 100	180pF 1500pF 18 ~ 58pF (E-12 Series)
5PA  (6 × 6 × 7.2mm) Max.		100μH ~ 4.5mH	80	180pF 1500pF 18 ~ 56pF (E-12 Series)



Type	Specifications	Freq. Range				L Range	Q (Typ.) Q	Int. cap. on option;
		kHz	kHz	MHz	MHz			
		10	100	1	10	100		
5S						1 $\mu$ H ~ 680 $\mu$ H	70 ~ 100	180pF 1500pF 18 ~ 56pF (E-12 Series)
(5.4 × 5.8 × 6.2mm) Max.								
5SU						100 $\mu$ H ~ 680 $\mu$ H	30	1500pF
(5.9 × 5.9 × 6.2mm) Max.								
5KM						0.03 $\mu$ H ~ 5 $\mu$ H	40 ~ 70	18 ~ 47pF (E-12 Series)
(5.9 × 5.9 × 7.5mm) Max.								
5K						0.08 $\mu$ H ~ 1 $\mu$ H	70	None
(5.9 × 5.9 × 6.2mm) Max.								
5KP						0.03 $\mu$ H ~ 0.5 $\mu$ H	40 ~ 60	18 ~ 47pF (E-12 Series)
(5.9 × 5.9 × 7.3mm) Max.								
5A						0.03 $\mu$ H ~ 0.3 $\mu$ H	50 ~ 70	None
(5.8 × 5.8 × 9.3mm) Max.								
7P						1 $\mu$ H ~ 1.1mH	70 ~ 110	430pF 180pF 5 ~ 100pF (E-12 Series)
(7.5 × 7.5 × 12mm) Max.								
7PU						100 $\mu$ H ~ 800 $\mu$ H	30	430pF 180pF (E-12 Series)
(7.5 × 7.5 × 12mm) Max.								
7PL						1 $\mu$ H ~ 500 $\mu$ H	60 ~ 100	430pF 5 ~ 100pF (E-12 Series)
(7.5 × 7.5 × 9.2mm) Max.								
7PS						1 $\mu$ H ~ 700 $\mu$ H	80	10 ~ 100pF (E-12 Series)
(7.3 × 7.3 × 6.9mm) Max.								
7PSU						1 $\mu$ H ~ 300 $\mu$ H	30	430pF
(7.8 × 7.8 × 6.9mm) Max.								






Type	Specifications	Freq. Range				L Range	Q (Typ.) Q	Int. cap. on option;
		kHz	kHz	MHz	MHz			
		10	100	1	10	100		
7PB						1 $\mu$ H ~ 700 $\mu$ H	80	12 ~ 330pF (E-12 Series)
(7.5 × 7.5 × 6.7mm) Max.								
7KM						0.03 $\mu$ H ~ 80 $\mu$ H	80	5 ~ 100pF (E-12 Series)
(7.5 × 7.5 × 13mm) Max.								
7KL						0.03 $\mu$ H ~ 50 $\mu$ H	80	5 ~ 100pF (E-12 Series)
(7.5 × 7.5 × 9.5mm) Max.								
7KB						0.1 $\mu$ H ~ 10 $\mu$ H	80	None
(7.5 × 7.5 × 12mm) Max.								
7KLS						0.03 $\mu$ H ~ 10 $\mu$ H	20	5 ~ 100pF (E-12 Series)
(7.5 × 7.5 × 6.8mm) Max.								
7KS						0.05 $\mu$ H ~ 10mH	100	None
(7.5 × 7.5 × 6.9mm) Max.								
7PA						1mH ~ 20mH	50	10 ~ 6800pF
(7.5 × 7.5 × 13.5mm) Max.								
7PLA						1mH ~ 15mH	50	10 ~ 6800pF (E-12 Series)
(7.5 × 7.5 × 9.5mm) Max.								
7TL						500 $\mu$ H ~ 10 $\mu$ H	50	None
(7.5 × 7.5 × 9.2mm) Max.								
7TS						200 $\mu$ H ~ 7mH	50	None
(7.5 × 7.5 × 6.4mm) Max.								
10EZ						2 $\mu$ H ~ 2mH	70 ~ 140	430pF 180pF 5 ~ 100pF (E-12 Series)
(10.5 × 10.5 × 13.5mm) Max.								

\* Adjustable from bottom (下側から調整可能な仕様あり)

Specifications Type	Freq. Range					L Range	Q (Typ.) Q	Int. cap. on option;
	kHz	kHz	MHz	MHz	MHz			
	10	100	1	10	100			









Specifications Type	Freq. Range					L Range	Q (Typ.) Q	Int. cap. on option;
	kHz	kHz	MHz	MHz	MHz			
	10	100	1	10	100			

<b>10K</b>						0.08 $\mu$ H ~ 50 $\mu$ H	80 ~ 100	5 ~ 100pF (E-12 Series)
(10.5 × 10.5 × 13mm) Max.								
<b>10PA</b>						1mH ~ 55mH	50	None
(10.5 × 10.5 × 14mm) Max.								






<b>MC137</b>						0.05 $\mu$ H ~ 0.2 $\mu$ H	70 ~ 110 at 100MHz	Single Winding only; no tap; Shield Case Available
(7.5 × 7.5 × 6.5mm) Max.								
<b>MC138</b>						0.25 $\mu$ H ~ 0.2 $\mu$ H	120 ~ 180 at 100MHz	1 tap Available; no Sec.-coil; Shield Case Available
(7.4 × 7.4 × 14mm) Max.								
<b>MC139/141</b>						0.01 $\mu$ H ~ 0.23 $\mu$ H	80 / 90 ~ 150 / 120 at 100MHz	No Sec.-coil; Shield Case Available
(5.9 × 5.9 × 8.5mm) Max.								
<b>MC152 (密着)</b> *						0.01 $\mu$ H ~ 0.12 $\mu$ H	100 at 100MHz	No tap 1st. Sec. Coil Available; Shield Case Available
(5.1 × 5.1 × 5.5mm) Max.								
<b>MC153</b>						0.01 $\mu$ H ~ 0.12 $\mu$ H	120	No tap 1st. Sec. Coil Available; Shield Case Available
(5 × 11.4 × 5mm) Max.								

\* Surface contacting (密着)

## Molded Coils モールドコイル

<b>MC110</b>						0.03 $\mu$ H ~ 1 $\mu$ H	200 ~ 260 at 58MHz 200 ~ 220 at 100MHz	Pri.; 2 taps; Sec. & Tert. Available
( $\phi$ 12.3 × 17mm) Max.								
<b>MC111</b>						0.03 $\mu$ H ~ 0.4 $\mu$ H	100	2 tap Available; no sec.-coil
(8.2 × 8.2 × 13.5mm) Max.								
<b>MC117</b>						0.03 $\mu$ H ~ 0.35 $\mu$ H	100 ~ 200 at 58MHz 150 ~ 200 at 100MHz	1 tap Available; no Sec.-coil; Shield Case Available
( $\phi$ 10.4 × 10.4 × 17.5mm) Max.								
<b>MC119</b>						0.03 $\mu$ H ~ 0.2 $\mu$ H	50 ~ 120 at 58MHz 120 ~ 180 at 100MHz	1 tap Available; Sec.-coil Available
(8.2 × 8.2 × 9.3mm) Max.								
<b>MC120</b>						0.03 $\mu$ H ~ 0.35 $\mu$ H	120	1 tap Available; Shield Case Available
(10 × 10 × 13mm) Max.								
<b>MC131</b>						0.03 $\mu$ H ~ 0.15 $\mu$ H	150	Secondary Winding Available
(8.3 × 8.3 × 6mm) Max.								
<b>MC134</b>						0.03 $\mu$ H ~ 0.58 $\mu$ H	110	No tap Shield Case Available
(7.3 × 7.3 × 13mm) Max.								
<b>MC136</b>						0.03 $\mu$ H ~ 0.44 $\mu$ H	110	No tap Shield Case Available
(7.5 × 7.5 × 10mm) Max.								











## Tape Recorder Coils テープレコーダコイル

<b>10YS</b>						50 $\mu$ H ~ 40mH	150	None
(10.5 × 10.5 × 12mm) Max.								
<b>10RS</b>						50 $\mu$ H ~ 10mH	120	None
(10.8 × 10.8 × 12.1mm) Max.								
<b>10YX</b>						50 $\mu$ H ~ 18mH	70	None
(10.5 × 10.5 × 15mm) Max.								
<b>12VXA</b>						1 $\mu$ H ~ 68mH	80	None
( $\phi$ 13 × 18mm) Max.								
<b>15RSL</b>						50 $\mu$ H ~ 25mH	150mH	None
( $\phi$ 16 × 15mm) Max.								

Specifications Type	Freq. Range					L Range	Q (Typ.) Q	Int. cap. on option;
	kHz	kHz	MHz	MHz	MHz			
	10	100	1	10	100			












Specifications Type	Freq. Range					L Range	Q (Typ.) Q	Int. cap. on option;
	kHz	kHz	MHz	MHz	MHz			
	10	100	1	10	100			

## Radial Fixed Coils ラジアルタイプ

<b>7BA</b>  (6 × 11.5 × 9.5mm) Max.						1μH ~ 1mH (E-24 Series)	30 Min.	None
<b>7BS</b>  (5.5 × 6.8 × 7mm) Max.						1μH ~ 1mH (E-12 Series)	50 Min.	None
<b>8RB</b>  (φ8 × 11.2mm) Max.						100μH ~ 35mH (E-12 Series)	80	None
<b>8RBC</b>  (φ9 × 10.5mm) Max.						1 ~ 45m (E-12 Series)	140	4 ~ 430pF 470 ~ 6800pF (E-12 Series)
<b>8RBS</b>  (φ8 × 8.2mm) Max.						56μH ~ 15mH (E-12 Series)	60	None
<b>8RHB</b> *1  (φ8.5 × 11mm) Max.						1μH ~ 1000μH (E-12 Series)	20	None
<b>8RDB</b> *2  (φ8.5 × 11mm) Max.						10 ~ 220μH (E-12 Series)	130	None
<b>10RB</b>  (φ10.5 × 14mm) Max.						1 ~ 120mH (E-12 Series)	70 ~ 100	None
<b>10RBM/L</b>  (φ10.8 × 9mm) Max.						560μH ~ 47mH (E-12 Series)	70 ~ 100	None
<b>10RBH</b>  (φ10.8 × 14mm) Max.						150mH ~ 1.5H (E-12 Series)	70 ~ 100	None

\*1: Available in taping form (テーピング可)  
\*2: Shield case available (シールドケース可)

## Coil for SMT 面実装コイル

<b>43CS/43FS</b>  (4.5 × 3.2 × 3.5mm) Max.						1 ~ 1000μH (E-12 Series)	50 Min.	None
<b>5CA</b>  (6.6 × 5.8 × 4mm) Max.						0.1 ~ 5mH	30	None
<b>5CCL/5CCD</b>  5CCL (5.7 × 5.7 × 5.0mm) Max. 5CCD (5.7 × 5.7 × 5.5mm) Max.						10 ~ 400μH ~ 10 ~ 700μH	50 50	5 ~ 330pF (E-12 Series) 2 Capacitance
<b>5CCA</b>  (5.7 × 5.7 × 6.0mm) Max.						0.1 ~ 7mH	40	None
<b>5CDL</b>  (5.3 × 5.3 × 2.2mm) Max.						1 ~ 300μH	50	None
<b>5CE</b>  (6.1 × 6.1 × 5.6mm) Max.						0.05 ~ 2μH	70	None
<b>5CBG</b>  (5.2 × 5.2 × 4.6mm) Max.						0.03 ~ 1.2μH	70	None
<b>5CBL</b>  (4.6 × 4.2 × 2.1mm) Max.						0.03μH ~ 1.2μH	50	None
<b>5FS</b>  (5.6 × 5.6 × 8mm) Max.						1 ~ 20mH	30	10 ~ 8200pF (E-12 Series) 2 Capacitance
<b>10RF</b>  (10 × 11 × 5.5mm) Max.						1 ~ 200μH	100	None
<b>12RF</b>  (12 × 13 × 6.5mm) Max.						1 ~ 500μH	100	None





(9.7 × 27 × 7.6mm) Max.

**RBT07S**

## Features

- Includes the antenna, RF and oscillator coils.
- With the oscillator coil, two chip capacitors can be built-in; in addition, a padding capacitor can be included.
- Can be built so that setting needs no adjustment.

## Specifications

ANT	7PS Type
RF	7PS Type
OSC	7PB Type

## 特長

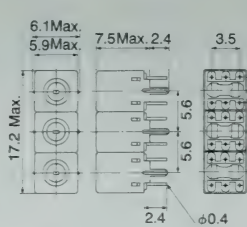
- アンテナ、RF、OSCコイルを内蔵可能。
- OSC用コイルにはチップコンデンサ2個まで内蔵。  
(パディングコンデンサ内付可)
- セットの無調整化も可能。
- 自動挿入化も可能。

## Duplexers for Cordless Phone コードレス電話用デュプレクサ

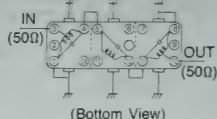


(5.9 × 17.2 × 7.5mm) Max.

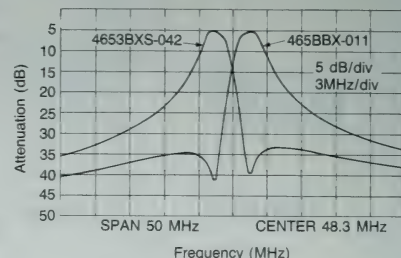
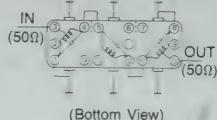
**5KMT**



465BBXS - 041



465BBXS - 042



## Surface-mounting Dual-toroidal core coil 面実装めがねコア形コイル



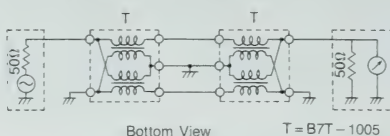
(6.9 × 6.9 × 5mm) Max.

**B5F**

## Features

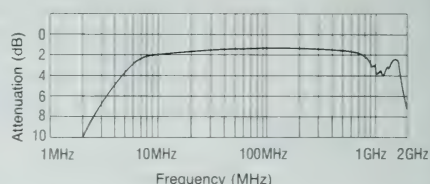
- Paired wires used in windings for a high degree of balancing.
- Coils can be wound for impedance conversion, double balanced mixing, circuit splitting, switching and other uses.
- Reflow soldering applicable.

## Typical characteristics



## 特長

- 巻線にはペア線を使用し高い平衡度を実現。
- インピーダンス変換器、ダブルバランスドミキサ、分配器、分岐器などの各種巻線仕様が可能。
- リフローはんだ対応。



## Dual-toroidal core coil ピンタイプめがねコア形コイル



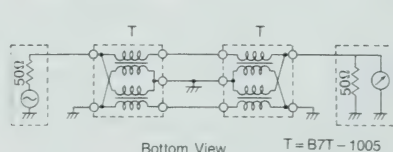
(7.2 × 7.2 × 6.8mm) Max.

**B7T**

## Features

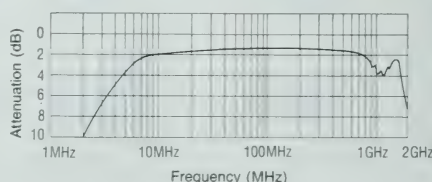
- High degree of balance realized with use of paired wires.
- Leads connected onto pin terminals for direct mounting on printed boards.
- Available for use as a double-balanced mixer, wide-band or an impedance converting transformer.

## Typical characteristics



## 特長


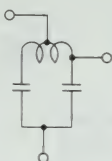
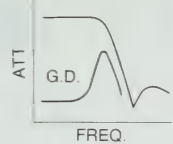




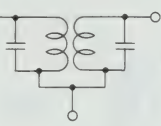


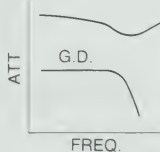
- 巻線にはペア線を使用し、高い平衡度を実現
- ピンに末端処理のため、プリント基板に直接マウント可能
- ダブルバランスドミキサ、広帯域トランス、インピーダンス変換用トランスと各種用途に応じ作製可



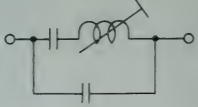
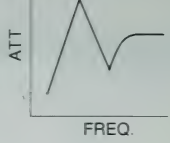


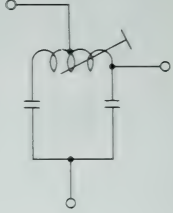
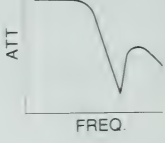








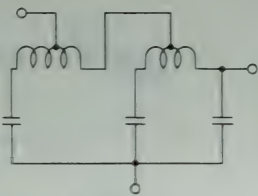

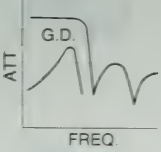

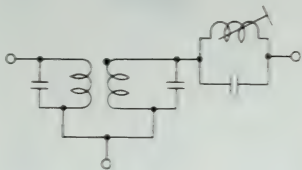




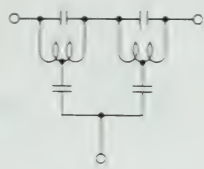





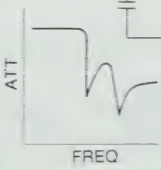
Miniature LC Filters Applications List 小形LCフィルタ用途別一覧


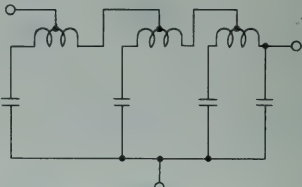
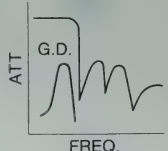




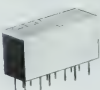



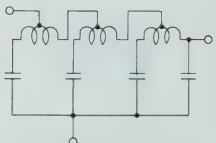
Equipment		Applicable circuit		LC Filter								for TV
				Surface Mounting	Filter						3 Terminal	
					4FL 4FU 4FN Series	5F Series	5VL 5VU 5VN Series	5VH Series	7PD	10PD	AB □ 07 AB □ 10L Series	
Video Disk	Video circuit			●						●		
	Sound circuit				●	●	●	●		●		
Video Camera	Video circuit	●		●		●				●		
	Sound circuit	●	●		●	●	●		●	●		
VCR	Video circuit			●						●		
	Sound circuit			●	●	●	●	●	●	●	●	
Color TV	Video circuit			●						●	●	
	Sound circuit				●	●	●	●		●	●	
TV (LCD)	Video circuit	●							●		●	
	Sound circuit		●		●	●						
Still Video Camers	Video circuit	●										


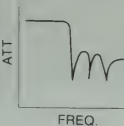

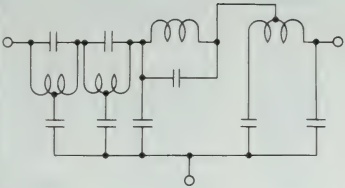
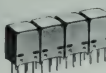




Miniature LC Filters 小形LCフィルタ

Structure	Use	Ext. Form	Type Name	Brief Description		Circuit Structure and Amplitude Characteristics
				Features	Applicable Conditions	
Single Built-in Inductor	For Video Signal Circuit	 (5.2 × 5.2 × 3.9mm) Max.	<b>4FJS</b>	<ul style="list-style-type: none"> <li>Low profile</li> <li>Surface mtg.</li> </ul>	<ul style="list-style-type: none"> <li>Frequency range: 0.1 to 15MHz</li> <li>Internal capacitors:               <ul style="list-style-type: none"> <li>4 to 750pF</li> <li>2 units can be included</li> </ul> </li> </ul>	 
		 (5.2 × 5.2 × 5.1mm) Max.	<b>4FUS</b>	<ul style="list-style-type: none"> <li>Surface mtg.</li> </ul>		
		 (5.5 × 5.5 × 5.1mm) Max.	<b>4FNS</b>	<ul style="list-style-type: none"> <li>High Qu</li> </ul>		
		 (6.1 × 6.1 × 6.8mm) Max.	<b>5VLS</b>	<ul style="list-style-type: none"> <li>Small size</li> <li>Low profile</li> <li>Pin type</li> </ul>		
		 (6.1 × 6.1 × 8mm) Max.	<b>5VUS</b>	<ul style="list-style-type: none"> <li>Small size</li> <li>Pin type</li> </ul>		
						 
						 

Structure	Use	Ext. Form	Type Name	Brief Description		Circuit Structure and Amplitude Characteristics
				Features	Applicable Conditions	
Single Built-in Inductor	For Video Signal Circuit		<b>5VNS</b>	<ul style="list-style-type: none"> <li>• High Qu</li> </ul>		
		(6.5 × 6.5 × 8mm) Max.				
			<b>4FS</b>	<ul style="list-style-type: none"> <li>• Surface mtg.</li> </ul>	<ul style="list-style-type: none"> <li>• Frequency range: 0.1 to 15MHz</li> <li>• Internal capacitors:               <ul style="list-style-type: none"> <li>• 4 to 750pF</li> <li>• 2 units can be included</li> </ul> </li> </ul>	 
		(5.2 × 5.2 × 5.1mm) Max.				
			<b>5VLS</b>	<ul style="list-style-type: none"> <li>• Small size</li> <li>• Low profile</li> <li>• Pin type</li> </ul>		
		(6.1 × 6.1 × 6.8mm) Max.				
	Sound Signal Circuit		<b>5VS</b>	<ul style="list-style-type: none"> <li>• Small size</li> <li>• Pin type</li> </ul>		 
		(6.1 × 6.1 × 8mm) Max.				
			<b>5FS</b>	<ul style="list-style-type: none"> <li>• Surface mtg.</li> </ul>	<ul style="list-style-type: none"> <li>• Frequency range: 10 to 200kHz</li> <li>• Internal capacitors:               <ul style="list-style-type: none"> <li>• 10 to 1000pF</li> <li>• For 10pD, to 6800pF</li> <li>• 2 units can be included</li> </ul> </li> </ul>	
		(5.6 × 5.6 × 8mm) Max.				
			<b>5VHS</b> <b>7PD</b>	<ul style="list-style-type: none"> <li>• Small size</li> <li>• Pin type</li> <li>• 7mm sq.</li> </ul>		
		(7.5 × 7.5 × 8mm) Max.				
			<b>10PD</b>	<ul style="list-style-type: none"> <li>• 10mm sq. pin</li> </ul>		
		(10.5 × 10.5 × 16.5mm) Max.				
Use of Two Inductors			<b>ABS07</b>	<ul style="list-style-type: none"> <li>• High Qu</li> <li>• Low profile</li> </ul>		
		(9 × 9.2 × 13.5mm) Max.				
Use of Two Inductors			<b>4FJW</b>	<ul style="list-style-type: none"> <li>• Low profile</li> <li>• Surface mtg.</li> </ul>		
		(6.2 × 10 × 3.9mm) Max.				

Structure	Use	Ext. Form	Type Name	Brief Description		Circuit Structure and Amplitude Characteristics
				Features	Applicable Conditions	
Use of Two Inductors	Video Signal Circuit		4FW	• Surface mtg	<ul style="list-style-type: none"> <li>Frequency range: 0.2 to 15MHz</li> <li>Internal capacitors: <ul style="list-style-type: none"> <li>4 to 750pF</li> <li>Up to 4 units, max., can be included</li> </ul> </li> <li>Adjustable inductance structure, 1 or 2, usable in all except 4FLW, 5VNW, and 5VFNW</li> </ul>	
			4FNW	• High Qu		
			5VLW	<ul style="list-style-type: none"> <li>• Small size</li> <li>• Low profile</li> <li>• Pin type</li> </ul>		
			5VSW	<ul style="list-style-type: none"> <li>• Small size</li> <li>• Pin type</li> </ul>		
			5VNW	• High Qu		
			5VFW	• Surface mtg.		
			5VFNW	<ul style="list-style-type: none"> <li>• High Qu</li> <li>• 3-terminals</li> </ul>		
Sound Signal Circuit			5VHW	<ul style="list-style-type: none"> <li>• Small size</li> <li>• Pin type</li> </ul>	<ul style="list-style-type: none"> <li>Frequency range: 10 to 200kHz</li> <li>Internal capacitors: <ul style="list-style-type: none"> <li>5VH: 10 to 8200pF</li> <li>ABW: 10 to 6800pF</li> </ul> </li> <li>4 units, max.</li> </ul>	
			ABW07	<ul style="list-style-type: none"> <li>• Small size</li> <li>• High Qu</li> </ul>		

Structure	Use	Ext. Form	Type Name	Brief Description		Circuit Structure and Amplitude Characteristics
				Features	Applicable Conditions	
Use of Three Inductors	Video Signal Circuit		<b>4FJT</b>	<ul style="list-style-type: none"> <li>Surface mtg</li> <li>Low profile</li> </ul>	<ul style="list-style-type: none"> <li>Frequency range: 0.1 to 15MHz</li> <li>Internal capacitors: <ul style="list-style-type: none"> <li>4 to 750pF</li> <li>6 units, max</li> </ul> </li> <li>Adjustable inductance structure, 0 to 3, usable in all except 4FLT, 5VNT, and 5VFNT</li> </ul>	 
			<b>4FT</b>	<ul style="list-style-type: none"> <li>Surface mtg.</li> </ul>		
			<b>4FNT</b>	<ul style="list-style-type: none"> <li>High Qu</li> </ul>		
			<b>5VLT</b>	<ul style="list-style-type: none"> <li>Small size</li> <li>Low profile</li> <li>Pin type</li> </ul>		
			<b>5VST</b>	<ul style="list-style-type: none"> <li>Small size</li> <li>Pin type</li> </ul>		
			<b>5VNT</b>	<ul style="list-style-type: none"> <li>High Qu</li> </ul>		
			<b>5VFT</b>	<ul style="list-style-type: none"> <li>Small size</li> <li>3-terminals</li> </ul>		
			<b>5VFNT</b>	<ul style="list-style-type: none"> <li>Small size</li> <li>3-terminals</li> </ul>		
Use of Three Inductors	Sound Signal Circuit		<b>5VHT</b>	<ul style="list-style-type: none"> <li>Small size</li> <li>Pin type</li> </ul>		

Structure	Use	Ext. Form	Type Name	Brief Description		Circuit Structure and Amplitude Characteristics
				Features	Applicable Conditions	
Use of Three Inductors	Sound Signal Circuit	 (9 × 25 × 13.5mm) Max.	<b>ABT07</b>	<ul style="list-style-type: none"> <li>• High Qu</li> <li>• 7mm sq.</li> </ul>	<ul style="list-style-type: none"> <li>• Frequency range: 10 to 200kHz</li> <li>• Internal capacitors: 5VH: 10 to 8200pF ABT: 10 to 6800pF</li> <li>• 6 units, max.</li> </ul>	
Use of Four Inductors	Video Signal Circuit	 (6.5 × 24 × 8mm) Max.	<b>5VH</b>	<ul style="list-style-type: none"> <li>• Small size</li> <li>• Pin type</li> </ul>	<ul style="list-style-type: none"> <li>• Frequency range: 0.1 to 15MHz</li> <li>• Internal capacitors: Range, 4 to 750pF; 10 units usable in 5VFNP and 8 units in others</li> <li>• Adjustable inductance structures, 0 to 4 units in 5VSQ and 5VFQ when required</li> </ul>	
		 (6.1 × 23.5 × 8mm) Max.	<b>5VSQ</b>	<ul style="list-style-type: none"> <li>• Small size</li> <li>• Pin type</li> </ul>		
		 (6.1 × 23.6 × 8.8mm) Max.	<b>5VFQ</b>	<ul style="list-style-type: none"> <li>• Small size</li> <li>• 3-terminal</li> </ul>		
		 (6.8 × 24 × 8.8mm) Max.	<b>5VFNQ</b>	<ul style="list-style-type: none"> <li>• High Qu</li> <li>• 3-terminal</li> </ul>		
		 (6.8 × 29.8 × 8.8mm) Max.	<b>5VFNP</b>	<ul style="list-style-type: none"> <li>• High Qu</li> <li>• 3-terminal</li> <li>• 5-section</li> </ul>		
	Multi-Inductor Type	 (6.8 × 47.5 × 8.8mm) Max.	<b>5VFNO</b>	<ul style="list-style-type: none"> <li>• High Qu</li> <li>• 3-terminal</li> <li>• 8-section</li> </ul>		
						<p>Phase compensation is possible with LPF and EQA in combination</p>

[illegible]

◆ glued type only recommended

**AM Ceramic Filter (CERATUNE)**

AMセラミックフィルタ (セラチューン)



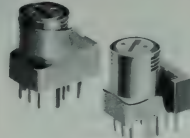
**CFA**

**Specifications**

Center Freq. Range	450 ~ 470kHz
Center Freq. Tolerance	$\pm 2.1\text{kHz}$ or $\pm 1.1\text{kHz}$
Bandwidth, 6dB	13 $\pm$ 3kHz
Selectivity, $\pm 9\text{kHz}$	6dB Min
Insertion Loss	5dB Max.

**AM Ceramic Filters with Matching Coil (CERATUNE)**

マッチングコイル付AMセラミックフィルタ (セラチューン)



**CFAZ**

**Specifications**

Center Freq. Range	450 ~ 470kHz
Center Freq. Tolerance	$\pm 2.5\text{kHz}$ or $\pm 1.5\text{kHz}$
Bandwidth, 6dB	5kHz Min
Selectivity, $\pm 9\text{kHz}$	18dB Min
Insertion Loss	75.5 $\pm$ 3dB

**AM Ceramic Filters (CERASIZER)**

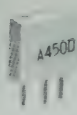
AMセラミックフィルタ (セラサイザ)



**CFM8**  
(Cerasizer)



**CFM2**  
(Cerasizer)



**CFMR**  
(Cerasizer)



**CFMA**  
(Triple-tuned)



**CFMT**  
(Triple-tuned)



**CFML**  
(Triple-tuned)



**CFMD**  
(Cerasizer)



**CFMY**  
(Quintuple)



**CFMQ**  
(Quintuple)



**CFMJ**  
(Quintuple)

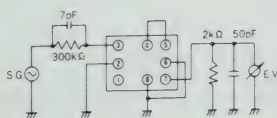


**CFMZ**  
(Quintuple)

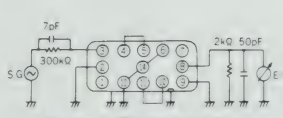
Item \ Type		CFM8	CFM2	CFMR	CFMD	CFMA	CFMT	CFML	CFMQ	CFMJ, CFMZ, CFMY
Center Frequency Range		220 ~ 380kHz	450 ~ 470kHz	450 ~ 470kHz	450 ~ 470kHz	450 ~ 470kHz	450 ~ 470kHz	450 ~ 470kHz	450 ~ 470kHz	450 ~ 470kHz
Center Frequency Tolerance		$\pm 2$ or $\pm 1\text{kHz}$	$\pm 2$ or $\pm 1\text{kHz}$	$\pm 2$ or $\pm 1\text{kHz}$	$\pm 2$ or $\pm 1.5\text{kHz}$	$\pm 2.5$ or $\pm 1.5\text{kHz}$	$\pm 2.5$ or $\pm 1.5\text{kHz}$	$\pm 2.5$ or $\pm 1.5\text{kHz}$	$\pm 2.5$ or $\pm 1.5\text{kHz}$	$\pm 2.5$ or $\pm 1.5\text{kHz}$
Bandwidth, 6dB	Z Rank		3kHz Min.	3kHz Min.	4kHz Min.					
	A Rank	4kHz Min.	4kHz Min.	4kHz Min.	4kHz Min.					
	B Rank	6kHz Min.	6kHz Min.	6kHz Min.	7kHz Min.	5kHz Min.	5kHz Min.	5.5kHz Min.	5.5kHz Min.	5kHz Min.
	C Rank	8kHz Min.	8kHz Min.	8kHz Min.	9kHz Min.					
	D Rank		10kHz Min.	10kHz Min.	10kHz Min.					
Selectivity $\pm 9\text{kHz}$ detuning	Z Rank		24dB Min.	24dB Min.	50dB Min.					
	A Rank	18dB Min.	18dB Min.	18dB Min.	45dB Min.					
	B Rank	16dB Min.	16dB Min.	16dB Min.	35dB Min.	25dB Min.	25dB Min.	25dB Min.	33dB Min.	40dB Min.
	C Rank	12dB Min.	12dB Min.	12dB Min.	25dB Min.					
	D Rank		9dB Min.	9dB Min.	20dB Min.					
Insertion Loss	Z Rank		7dB Max.	7dB Max.	6dB Max.					
	A Rank	6dB Max.	6dB Max.	6dB Max.	6dB Max.					
	B Rank	6dB Max.	6dB Max.	6dB Max.	6dB Max.	78.5 $\pm$ 3dB	70 $\pm$ 3dB	94.5 $\pm$ 3dB	82 $\pm$ 3dB	82 $\pm$ 3dB
	C Rank	6dB Max.	6dB Max.	6dB Max.	6dB Max.					
	D Rank		6dB Max.	6dB Max.	6dB Max.					

**Measurement Circuit 測定回路**

**CFMA, CFML, CFMT**

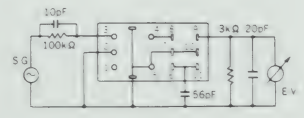


**CFMQ**



但し50pFは測定系の容量を含む

**CFMJ**



## AM Ceramic Filters AMセラミックフィルタ



CMU1

## Description

The CMU1 Series of ceramic resonators are specially designed for the search-stop signal detection in AM electronically-tuned radio sets.

## Features

- High accuracy of resonating frequency.
- High stability and uniformity in characteristics.
- Can be used with an IF filter in circuit.

## 概要

A M電子同調ラジオのサーチストップ信号検出用セラミック共振子です。

## 特長

- 共振周波数の精度が良い。
- 特性のバラツキが少なく高安定です。
- IF段用フィルタとのセット納入ができます。

## Specifications

Part No.	CMU1-450AO1	CMU1-459AO1
Resonant Frequency	450 $\pm$ 0.8 MHz	459 $\pm$ 0.8 kHz
$\Delta F$ (Fa — Fr)	9.0 $\pm$ 2.0 kHz	9.0 $\pm$ 2.0 kHz
Resonant Resistance	< 30 $\Omega$	< 30 $\Omega$
Static Capacitance	360 pF $\pm$ 20%	350 pF $\pm$ 20%
Withstanding Voltage	50 VDC, 1 min.	50 VDC, 1 min.

## Ceramic Oscillating Elements (CERASONATOR®) セラミック発振子(セラゾネータ®)



CRL



CRK



CRA



CRHF

(デービング可)



CRHT

(Built-in Capacitor type)

(Built Capacitor type)

## Specifications

Item	Type	CRL	CRK	CRA	CRHF	CRHT
Frequency Range		220 ~ 380kHz	380 ~ 680kHz	455 ~ 500kHz	2.5 ~ 6.0MHz	2.5 ~ 6.0MHz
Initial Freq. Tolerance		$\pm$ 3% Max.	$\pm$ 1% Max.	$\pm$ 1% Max.	$\pm$ 1% Max.	$\pm$ 1% Max.
Resonant Resistance		400 $\Omega$ Max.	400 $\Omega$ Max.	3k $\Omega$ Max.	30 $\Omega$ Max.	30 $\Omega$ Max.
Temp. Coefficient, (−20 ~ +80°C)		$\pm$ 0.3% Max.	$\pm$ 0.3% Max.	$\pm$ 0.3% Max.	$\pm$ 0.5% Max.	$\pm$ 0.5% Max.
Aging (10 yr.)		$\pm$ 0.3% Max.	$\pm$ 0.3% Max.	$\pm$ 0.3% Max.	$\pm$ 0.3% Max.	$\pm$ 0.3% Max.
External Capacitors for Standard Test Circuit	C <sub>1</sub>	560pF	560pF (470pF)	Not used	30pF	Not used
	C <sub>2</sub>	560pF	200pF (200pF)	Not used	30pF	Not used

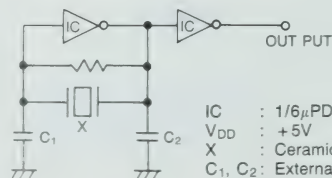
Notes: 1. Initial frequency tolerance to  $\pm$  0.2% is possible in steps of 0.1% in the range given in the table.

2. Depending on the IC to be tested, different values for the external capacitors may be required.

(注) 周波数の初期偏差は、上表の標準値から、1%をききみて $\pm$ 0.2%迄可能です。\* 外部容量は使用するICによって異なります

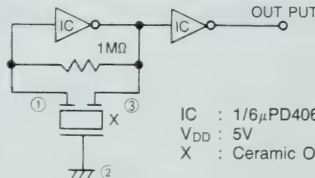
## Measurement Circuit 測定回路

## (CRL, CRK, CRHF)



IC : 1/6 $\mu$ PD4069  
V<sub>DD</sub> : +5V  
X : Ceramic Oscillating Elements  
C<sub>1</sub>, C<sub>2</sub> : External capacitor

## (CRA, CRHT)



IC : 1/6 $\mu$ PD4069UBC  
V<sub>DD</sub> : 5V  
X : Ceramic Oscillating Elements

## FM Ceramic Filters FMセラミックフィルタ



## CFSK Series

## Description

The ceramic filters in the CFSK Series are specially adapted for use in the IF circuit of thin-type FM receivers.

Recently, two types of filters have been added, namely, the wide-band for satellite broadcast reception and digital communicators, and the narrow band for European and American FM program reception.

Again, depending on the application, there is a wide choice of filters available; standard "S-series", low-loss "X-series" and the "G-series" with controllable group delay.

## Features

1. Low profile for suitability in small thin sets.
2. Low temperature coefficient and uniformity in performance.
3. High selectivity characteristics enable suppression of spurious signals.
4. Self-supporting terminals for ease in assembly.
5. Can be supplied with the AM filter in Kit form.

## General Data

Standard center frequencies: 10.7 and 10.52MHz

Custom center frequency range: 10.3~11.5MHz.

## 概要

"CFSKシリーズ"は、セットの薄型化、小型化に対応して開発されたFM-IF段用セラミックフィルタです。

新たに、BSチューンやデジタル通信機器対応の広帯域品、欧州・アメリカのFM局対応の狭帯域品が加わりました。

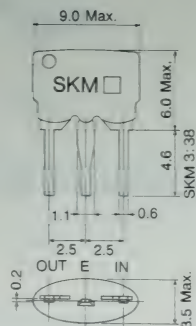
また、用途特性から標準のSシリーズ、低損失のXシリーズ、群遅延時間管理のGシリーズと製品バリエーションが広がり多様化するあらゆるご要求に対応できます。

## 特長

- 小形低背であり、薄形セットに最適です。
- 低温度係数で、バラツキが少なく安定した特性を持っています。
- 高選択特性でスプリアス抑圧が優れています。
- 自立形端子構造です。
- AMフィルタとのキット納入が可能です。

## 仕様

- 標準中心周波数 : 10.7MHz、10.52MHz
- 対応可能中心周波数範囲 : 10.3MHz~11.5MHz



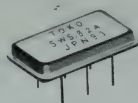
## Standard "S-series"

TOKO Part Number	Bandwidth		Insertion Loss (dB) Max.	Spurious Response (dB) Min. (9~12MHz)
	3dB (kHz) Max.	20dB (kHz) Max.		
SK107MO	330 ± 50	680	6.0	30
SK107M1	280 ± 50	650	6.0	30
SK107M2	230 ± 50	600	6.0	40
SK107M3	180 ± 40	520	7.0	40
SK107M4	150 ± 40	400	10.0	40
SK107M5	110 ± 30	350	10.0	30

## Low-loss "X-series"

TOKO Part Number	Bandwidth		Insertion Loss (dB) Max.	Spurious Response (dB) Min. (9~12MHz)
	3dB (kHz) Max.	20dB (kHz) Max.		
SK107MO-X	330 ± 50	680	4.0	30
SK107M1-X	280 ± 50	650	4.0	30
SK107M2-X	230 ± 50	600	4.5	40
SK107M3-X	180 ± 40	520	5.0	40
SK107M4-X	150 ± 40	400	7.0	40
SK107M5-X	110 ± 30	350	8.0	30

## SAW Filters 自動車電話 第1中間周波用 SAW フィルタ

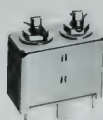


SWS

## Specifications

Center Frequency (Fo)	(82MHz ~ 95MHz)
Bandwidth, 3dB	±15kHz Min.
Insertion Loss	4dB Max.
Ripple	1.5dB Max.
Group Delay	10μs Max. at Fo ± 10kHz
Attenuation	Fo - 60kHz ~ Fo - 1000kHz, 25dB Min. Fo + 60kHz ~ Fo + 1000kHz, 25dB Min. Fo - 890kHz ~ Fo - 930kHz, 70dB Min. Fo + 890kHz ~ Fo + 930kHz, 70dB Min.
Cross Modulation	-95dB Max. Input -20dBm
Operating Temperature	-30°C ~ +80°C

## Helical Filters for Communications Equipment 通信機用ヘリカルフィルタ

(6 × 11.3 × 8mm) Max.  
**5HW, 5HRW**(7.6 × 15.2 × 11mm) Max.  
**7HW**(6 × 17 × 8mm) Max.  
**5HT, 5HRT**(7.6 × 22.5 × 11mm) Max.  
**7HT**(13 × 26.4 × 20mm) Max.  
**CBW**(13 × 38.9 × 20mm) Max.  
**CBT**(19 × 32 × 24mm) Max.  
**HRW**(19 × 62 × 24mm) Max.  
**HRQ**(6 × 11 × 4.5mm) Max.  
**5CHLW**(6 × 11.5 × 6.3mm) Max.  
**5CHW**(6 × 17.3 × 6.3mm) Max.  
**5CHT**

## Specifications

Type Item	5CHLW	5CHW	5CHT	5HW Double-tuned Type	5HT Triple-tuned Type	7HW Double-tuned Type	7HT Triple-tuned Type	CBW Double-tuned Type	CBT Triple-tuned Type	HRW Double-tuned Type	HRQ Quadrupl- tuned Type
Applicable frequency range	800 ~ 1100 MHz	400 ~ 500 MHz	400 ~ 500 MHz	350 ~ 1500MHz		350 ~ 1200MHz		130 ~ 220MHz		350 ~ 520MHz	
Bandwidth	20MHz Min.	20MHz Min.	20MHz Min.	20MHz Min.		6MHz Min.		2MHz Min.		6MHz Min.	
Input-output Impedance	50Ω										

## Miniature Dielectric Type Filters 小型誘電体フィルタ

## Specifications

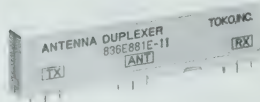
Item	Type	E - AMPS/NMT900 (セルラー電話)		Cordless Telephone		GPS
		6DFA-836E-10	6DFB-836E-10	6DFA-914A-10	6DFB-914A-10	6DFA-1575B-12
Center Frequency (Fo)	MHz	836.5	836.5	914.5	914.5	1575.4
Bandwidth	MHz	Fo ± 12.5	Fo ± 12.5	Fo ± 0.5	Fo ± 0.5	Fo ± 5
Bandwidth Insertion Loss	dB Max.	1.8	2.0	2.2	4.0	1.8
Bandwidth Ripple	dB Max.	0.8	0.8	0.5	0.5	0.8
Bandwidth V.S.W.R.	Max.	2.0	2.0	1.8	2.0	2.0
Attenuation at Fo ± 77.5MHz	dB Min.	2.0	—	—	—	—
Attenuation at Fo ± 32.5MHz	dB Min.	—	12	—	—	—
Attenuation at Fo ± 45MHz	dB Min.	—	—	24	45	50
Attenuation at Fo ± 50MHz	dB Min.	—	—	—	—	12

**6DFA**  
(2 pole)**6DFB**  
(3 pole)

## Antenna Duplexers アンテナデュプレクサ

## Specifications (6DPP-836E881E-10)

Item	Type	TX	RX
Center Frequency		836.5MHz	881.5MHz
Bandwidth		±12.5MHz	±12.5MHz
Bandwidth Insertion Loss		2.3dB Max.	3.6dB Max.
Bandwidth Ripple		1.0dB Max.	1.4dB Max.
Bandwidth V.S.W.R.		1.7 Max.	1.7 Max.
Attenuation	824 ~ 849MHz		60dB Min.
	869 ~ 894MHz	43dB Min.	
Impedance		50Ω	50Ω

**6DPP**

# Variable Capacitance Diode Application (For AM, FM, UHF)

AM FM UHF 用電圧可変容量ダイオード用途別一覧

Type		Recommended uses				Circuits and functions	Operating voltage (V)	Package	Surface Mounting	Taping	
		Audio	Car radios	Video equip.	Communications equip.						Production equip.
						Tuning capacitance	Capacitance ratio				
AM Variable Capacitance	KV1226	●		●		25V series, 2 element	C1V: 510 ~ 620 C24V: 16 ~ 26	20	25	CB-24	
	KV1230Z	●			●	8V series, 1 element VFO control			8	CB-1-2	
	KV1234Z	●	●			8V series, 4 element	C1V: 445 ~ 535	16.5 ~ 22	8	CB-4-8	
	KV1235Z		●			8V series, 3 element	C8V: 22.5 ~ 30.5			CB-3-6	
	KV1236Z	●	●		●	8V series, 2 element				CB-2-4	
	KV1260	●				8V series, 2 element, 1 chip	C1V: 445 ~ 535	16.5 ~ 22	8	CB-1-3	●
	KV1260-2		●			8V series, 4 element, 2 chip	C8V: 22.5 ~ 30.5			CB-2-6	
	KV1280	●	●			7V series, 2 element, 1 chip, wide band coverage				CB-1-3	
	KV1280-2		●			7V series, 4 element, 2 chip, wide band coverage				CB-2-6	
	KV1281	●			●	7V series, 1 element, wide band coverage	C1V: 426 ~ 508	17	7	CB-1-2	
	KV1281-2	●	●		●	7V series, 2 element, wide band coverage	C7V: 18 ~ 28			CB-2-4	
	KV1281-3		●			7V series, 3 element, wide band coverage				CB-3-6	
	KV1530	●		●	●	8V series, 1 element, VFO control	C1V: 400 ~ 535 C7V: 35 (TYP)	—	7	SOT-23	● ●
	KV1550	●	●		●	4.5V series, 2 element, 1 chip	C1V: 430 ~ 490	16.5 ~ 20	4.5	SOT-23L	● ●
	KV1550NT	●	●		●	4.5V series, 2 element, 1 chip	C4.5V: 20 ~ 26			TO-92	●
	KV1560	●			●	8V series, 2 element, 1 chip				SOT-23L	● ●
	KV1560NT	●			●	8V series, 2 element	C1V: 428 ~ 506	17	8	TO-92	●
	KV1562M		●			8V series, 4 element, mini flat	C8V: 20 ~ 27.5			MFP-8	● ●
	KV1563M		●			8V series, 3 element, mini flat				MFP-8	● ●
	KV1580	●	●			6.5V series, mini mold, TWIN type	C1V: 415 ~ 465	17		SOT-23L	● ●
	KV1580NT	●	●			6.5V series, mini mold, TWIN type	C6.5V: 21 ~ 27			TO-92	●
	KV1581	●	●		●	6.5V series, mini mold, single type			6.5	SOT-23	● ●
KV1581A-1	●	●		●	6.5V series, mini mold, single type	C1V: 415 ~ 465	17		CB-1-3		
KV1581A-2	●	●		●	6.5V series, mini mold, single type	C6.5V: 21 ~ 27			CB-2-6		
KV1581A-3	●	●		●	6.5V series, mini mold, single type				CB-3-9		
FM Variable Capacitors	KV1310NT	●	●		●	8V series, twin type	C2V: 19.1 ~ 24.5 C8V: 8 ~ 10.7	2.2 ~ 2.6	8	TO-92	●
	KV1310A-2	●				8V series, 2 element, twin type	C2V: 20.2 ~ 24.5		8	CB-2-6	
	KV1310A-3	●	●			8V series, 3 element, twin type	C8V: 8 ~ 10.7	2 ~ 2.6	8	CB-3-9	
	KV1320	●	●		●	25V series, twin type	C7V: 19.8 ~ 23.1 C25V: 6.9 ~ 8.3	2.57 ~ 3.03	25	TO-92	●
	KV1330	●	●		●	9V series, wide band coverage, twin type	C2V: 32.6 ~ 41.8	3.7 ~ 5	4.5 ~ 9	TO-92	●
	KV1330A-1	●	●		●	9V series, wide band coverage, twin type	C9V: 7.5 ~ 10.2		4.5 ~ 9	CB-1-3	
	KV1330A-2	●	●			9V series, 2 element, wide band coverage, twin type	C2V: 33.3 ~ 41		4.5 ~ 9	CB-2-6	
	KV1330A-3	●	●			9V series, 3 element, wide band coverage, twin type	C9V: 7.7 ~ 10.1	3.7 ~ 5	4.5 ~ 9	CB-3-9	
	KV1340A-3	●	●			8V series, 3 element, twin type	C2V: 20.8 ~ 24.3 C8V: 13.5	1.55 ~ 1.85	8	CB-3-9	
	KV1350NT	●	●		●	9V series, wide band coverage, twin type	C1V: 29.57 ~ 32.97 C9V: 5.5 ~ 6.8	4.6 Min.	4.5 ~ 9	TO-92	●
	KV1410	●	●		●	8V series, mini mold, twin type	C7V: 19.1 ~ 24.5 C8V: 8 ~ 10.7	2 ~ 2.8	8	SOT-23	● ●
	KV1420	●	●		●	25V series, mini mold, twin type	C7V: 33.6 ~ 40.9 C9V: 7.7 ~ 10.1	2.57 ~ 3.03	25	SOT-23	● ●
	KV1430	●	●		●	9V series, mini mold, twin type	C2V: 33.6 ~ 40.9 C9V: 7.7 ~ 10.1	2 ~ 2.8	4.5 ~ 9	SOT-23	● ●
	KV1440	●	●		●	8V series, mini mold, twin type	C2V: 20.8 ~ 24.3 C8V: 13.5	1.55 ~ 1.85	8	SOT-23	● ●
	KV1450	●	●		●	9V series, wide band coverage, mini mold, twin type	C1V: 29.57 ~ 32.97 C9V: 5.5 ~ 6.8	4.6 Min.	4.5 ~ 9	SOT-23	● ●
	KV1470	●	●		●	5V series wide band coverage mini mold, twin type	C1V: 65.8 ~ 74.2 C5V: 12.5	5.0 Min.	5	SOT-23	● ●
UHF-VCD	KV1812	●			●	8V series, mini mold single type	C1V: 14.50 ~ 17.50 C8V: 1.64 ~ 2.24	7.4 Min.	8	SOT-23	● ●
	KV1821	●			●	25V series, mini mold single type	C1V: 18.4 C2.5V: 2.61 ~ 3.04	6.48 Min.	25	SOT-23	● ●
	KV1832	●			●	4V series, mini mold single type	C1V: 15.4 ~ 17.4 C4V: 3.6 ~ 1.5	3.7 Min.	4	SOT-23	● ●

## 4.5V Series Variable Capacitance Diodes for AM 4.5V系 AM用電圧可変容量ダイオード

**KV1550**

**KV1550NT**

### Specifications

Item	Type	KV1550	KV1550NT
Reverse voltage (V)		15	15
Tuning capacitance (1V)		430 ~ 490pF	430 ~ 490pF
Tuning capacitance (4.5V)		30 ~ 38pF	30 ~ 38pF
Capacitance ratio		11.4 ~ 16.2	11.4 ~ 16.2
Q (1V)		200Min.	200Min.
ΔC (1V)		2% Max.	2% Max.

## 7V, 8V Series Variable Capacitance Diodes for AM 7V系, 8V系 AM用電圧可変容量ダイオード



**KV1260**

**KV1280**

**KV1581A-1**



**KV1260-2**

**KV1280-2**

**KV1581A-2**



**KV1581A-3**



**KV1230Z**

**KV1281**



**KV1281-2**

**KV1236Z**



**KV1281-3**

**KV1235Z**



**KV1234Z**



**KV1560NT**



**KV1530**

**KV1581**



**KV1560**

**KV1580**



**KV1562M**

**KV1563M**

### Specifications

Item	Type	KV1280	KV1280-2	KV1281	KV1281-2	KV1281-3	KV1230Z ~ KV1236Z	KV1260 ~ KV1260-2	KV1530	KV1560 ~ KV1563M	KV1581 SERIES
Reverse voltage (V)		20		20			20		15	16	20
Tuning capacitance (1V)		426 ~ 508pF		426 ~ 508pF			445 ~ 535pF		400 ~ 535pF	428 ~ 506pF	415 ~ 465pF
Tuning capacitance (4.5V)		18 ~ 28pF		18 ~ 28pF			22.5 ~ 30.5pF		35pF (TYP.)	20 ~ 27.5pF	21 ~ 27pF
Capacitance ratio		17 Min.		17 Min.			16.5 ~ 22		—	17 Min.	17
Q (1V)		200 Min.		200 Min.			200 Min.		150 Min.	—	200 Min.
ΔC (1V)		15% Max.		KV1281-2 2%	KV1281-3 3%		34Z, 35Z 2%, 36Z 1%	1% Max	—	1% Max.	1% Max

## 25V Series Variable Capacitance Diodes for AM 25V系 AM用電圧可変容量ダイオード



**KV1226**

### Specifications

Item	Type	KV1226
Reverse voltage		30
Tuning capacitance (1V)		510 ~ 620pF
Tuning capacitance (25V)		16 ~ 26pF
Capacitance ratio		20 Min.
Q (1V)		200 Min.
ΔC (1V)		2%
Freq. selection		available

**Variable Capacitance Diodes for Wide band FM** FM用電圧可変容量ダイオード(ワイドバンド対応)



**KV1330NT**  
**KV1350NT**

**KV1430**  
**KV1450**  
**KV1470**



**KV1330A-1**



**KV1330A-2**



**KV1330A-3**

**Specifications**

Item \ Type	KV1330NT	KV1330A Series	KV1430	KV1350NT	KV1450	KV1470
Reverse voltage	16V			16V		16V
Tuning capacitance (2V)	33.3 ~ 41.0pF			29.57 ~ 32.97pF (1V)		65.8 ~ 74.2pF (1V)
Tuning capacitance (9V)	7.7 ~ 10.1pF			5.5 ~ 6.8pF		12.5pF (5V)
$\Delta C$	3% Max. (2V)			3% Max. (1V)		3% Max. (1V)
$r_s$ (70MHz)	0.5 $\Omega$ Max.			0.5 $\Omega$		0.65 $\Omega$
Capacitance ratio	3.7 ~ 5.0			4.6 Min.		5.0 Min.

**8V, 25V Series Variable Capacitance Diodes for FM** 8V系, 25V系 FM用電圧可変容量ダイオード



**KV1310NT**



**KV1310A-2**



**KV1310A-3**



**KV1340A-3**



**KV1410**  
**KV1440**



**KV1320**



**KV1420**

**Specifications**

Item \ Type	KV1310NT	KV1310A series	KV1340A-3	KV1410	KV1440	KV1320	KV1420
Reverse voltage	16V					30V	
Tuning capacitance (2V)	19.1 ~ 24.5pF	20.2 ~ 24.5pF	20.8 ~ 24.3pF	19.1 ~ 24.5pF	20.8 ~ 24.3pF	19.8 ~ 23.1pF (7V)	
Tuning capacitance (8V)	8.0 ~ 10.7pF	8.0 ~ 10.7pF	13.5pF TYP.	8.0 ~ 10.7pF	13.5pF TYP.	6.9 ~ 8.3pF (25V)	
$\Delta C$ (2V)	3% Max.					3% Max.	
$r_s$ (70MHz)	0.5 $\Omega$ Max.					0.5 $\Omega$ Max.	
Capacitance ratio	2.2 ~ 2.6	2.2 ~ 2.6	1.65 ~ 1.75	2.0 ~ 2.6	1.65 ~ 1.75	25.7 ~ 3.03	

**Variable Capacitance Diodes for UHF** UHF用電圧可変容量ダイオード

**KV1812**

**KV1821**

**KV1832**

**Specifications**

Item \ Type	KV1812	KV1821	KV1832
Reverse voltage	20	26	20
Tuning capacitance	14.50 ~ 17.50pF (1V)	18.4pF (1V)	16.6pF (1V)
Tuning capacitance	1.64 ~ 2.24pF (8V)	2.64 ~ 3.04pF (25V)	3.6 ~ 4.5pF (4V)
$r_s$ (70MHz)	2.10	1.0	0.7
Capacitance ratio	7.4	6.84	3.7

## Semiconductors &amp; IC Applications (For Communications Equip.) 通信機用半導体用途別一覧

Type	Recommended uses				Circuits and functions	Operating voltage (V)	Package	Surface Mounting	Taping
	Audio	Car radios	Video equip.	Communications equip.					
TK10420D, M				●	FM IF system IC (for use in cordless phones, personal radios), up to 60MHz 狭帯域FM受信システムIC(コードレスホン、パーソナル無線用)・ミクサ入力60MHz可	4~10	DP-20, MFP-20	M	M
TK10421D, M				●	FM IF system IC (for use in cordless phones, amateur radios), up to 60MHz, low voltage low current operation 狭帯域FM受信システムIC(コードレスホン、パーソナル無線用)・ミクサ入力60MHz可・低電圧低電流動作	2.7~10	DP-20, MFP-20	M	M
TK10483Z-1				●	High sensitivity FM IF system IC (for use in transceivers, radio controls, etc.), with signal meter output, up to 60MHz 高感度狭帯域FM受信システムIC(トランシーバ、ラジコンetc.)・Sメータ出力付・ミクサ入力60MHz可	2.5~9	ZP-20		
TK10485D, M				●	High sensitivity FM IF system IC (for use in cordless phones, amateur radios, etc.), with signal meter output, up to 60MHz 高感度狭帯域FM受信システムIC(コードレスホン、アマチュア無線etc.)・Sメータ出力付・ミクサ入力60MHz可	2.5~8.5	MFP-20	M	M
TK10486M				●	High sensitivity FM IF system IC (for use in cordless phones, amateur radios, etc.), with signal meter output, up to 60MHz 高感度狭帯域FM受信システムIC(コードレスホン、アマチュア無線etc.)・Sメータ出力付・ミクサ入力60MHz可	2.5~8.5	MFP-20	●	●
TK10487M				●	High sensitivity FM IF system IC (for use in cordless phones, MCA, etc.), with wide signal meter output, up to 60MHz 高感度狭帯域FM受信システムIC(コードレスホン、MCAetc.)・ワイドSメータ出力付・ミクサ入力60MHz可	2.5~8.5	MFP-20	●	●
TK10440M, V				●	Low voltage operating FM IF system IC (for use in pagers, cordless phones) with DATA Shaper for POC SAG, Quick charger, 1V regulator 低電圧駆動狭帯域FM受信システムIC(ページャー・コードレス、etc.)ボクサグ対応の波形整形回路、クイックチャージャー、1Vレギュレータ内蔵	1.1~6.0	MFP-20, VSOP-20	●	●
TK10445M, V				●	Low voltage operating FM IF system IC (for use in pagers, cordless phones) with Quadrature Detector, 1V regulator. Low power consumption, can be used with ceramic discriminator for adjust-less. 低電圧駆動狭帯域FM受信システムIC(ページャー・コードレス、etc.)ケオドラチャー検波器、1Vレギュレータ内蔵。低消費電流、セラミック・ディスクリミネータにて無調整化可能	0.9~3.5	MFP-20, VSOP-20	●	●
TK10447M, V				●	Low voltage operating FM IF system IC (for use in pagers, cordless phones) up to 30MHz, with Quadrature Detector, 1V regulator, DATA amp., Limiter amp. 伝電圧駆動狭帯域FM受信システムIC(ページャー・コードレス、etc.)ケオドラチャー検波器、1Vレギュレータ、データアンプ、リミッターアンプ内蔵。ミクサ入力30MHz可能	0.9~3.5	MFP-20, VSOP-20	●	●
TK10650M, D				●	Cordless and regular telephone noise reduction system IC, compandor + mike amp, mute, intercom, with built-in IDC circuit コードレスホン/電話用ノイズリダクションシステムIC・コンパンダ+マイクアンプ・ミュート・インタカム+IDC回路内蔵	3~9	DP-20, MFP-20	M	M
TK10651D, M				●	Cordless and regular telephone noise reduction system IC, compandor + mike amp, splatter filter, data IN/OUT, with built-in IDC circuit コードレスホン/電話用ノイズリダクションシステムIC・コンパンダ+マイクアンプ・スプラッタフィルタ・データIN/OUT+IDC回路内蔵	2.4~7	DP-20, MFP-20	M	M
TK10652M				●	A noise reduction system IC compandor + mute + through + 2 op amps for use in car telephones, cordless telephones, and MCA systems 自動車電話 コードレスホン MCA用ノイズリダクションシステムIC・コンパンダ+ミュート+スルー+オペアル2個内蔵	2.4~7	MFP-20, FP20	M	M
TK10654M, V				●	A noise reduction system IC for cordless and regular telephones. Terminal for de-emphasis available (can be fit for scrambler IC) Other features are the same as TK10651 コードレスホン・電話用ノイズリダクションシステムIC。プリエンファシス/リエンファシス用の端子付。スクランブラーICに最適。他の特性はTK10651と同等。	2.4~7.0	MFP-28 VSOP-24	●	●
TK10655M				●	A noise reduction system IC for cordless and regular telephones. Terminal for variable MIC amp's gain. Other features are the same as TK10651 コードレスホン・電話用ノイズリダクションシステムIC。マイクアンプのゲインを外部可変可能。他の特性はTK10651と同等。	2.4~7.0	MFP-20	●	●
TK10752Q				●	FM IF system & Noise reduction system (compandor) IC, FM IF section (Mixer, Local osc, IF amp, Noise filter, Squelch and RSSI) and compandor section (with MIC amp, DATA amp, Mute, IDC, etc.) built in one tip FM IF 検波ICとコンパンダICを1チップ化。ミキサー、スケルチ、Sメータ等の検波部とマイクアンプ、データアンプ、IDC、等のコンパンダ部のコードレスホンに必要な機能を内蔵。	1.1~6.0	QFP-52	●	

FM-IF & Detection ICs for Communication Equipment 通信機用FM-IF検波IC



TK10483Z



TK10420M  
TK10421M



TK10485M  
TK10486M  
TK10487M



TK10420D  
TK10421D  
TK10485D

Features

- Wide operating voltage range.
- High mixer input frequency. (455kHz~60MHz)
- High limiting sensitivity. (2 $\mu$ V)
- Few external parts required.
- Adjustable squelch hysteresis width.
- Usable with a ceramic discriminator.

特 長

- 動作電圧範囲が広い。
- ミキサ入力周波数が高い。(455kHz~60MHz)
- リミッティング感度が高い。(2 $\mu$ V)

- 外付部品添数が少ない。
- スケルチヒステリシス幅が調整できる
- セラミックディスクリミネータが使用できる

Specifications

Item	Type	TK10420 (D, M)	TK10421 (D, M)	TK10483Z-1 TK10485~7
Supply Voltage Range		4~10V	2.7~5.5V	2.5~8.5V
Current (Squelch off)		2.5mA	1.5mA	4.4mA
Limiting Sensitivity		3 $\mu$ V at Vcc=6V	6 $\mu$ V at Vcc=3V	2 $\mu$ V at Vcc=3V
Detected Output Voltage		550mV	220mV	
Trigger Hysteresis		100mV	40mV	80mV
Mixer Conversion Gain		20dB	16dB	25dB



TK10440M



TK10440V

Features

- Low current consumption.
- Data shaper for POCsAG available.
- Built-in comparator.
- Built-in Quick charger circuit.
- 1 volt regulator available.
- Low voltage operation (1.1~6.0 V)

特 長

- 低消費電流
- DC転送可能な波形整形回路
- コンパレータ内蔵
- クイックチャージャー。
- 1Vレギュレータ内蔵
- 低電圧動作。(1.1~6.0V)

Specification

Item	Standard	Conditions
Current consumption	0.8mA	Vcc = 1.4V
Limiting sensitivity	15dB $\mu$	at -3dB point

Item	Standard	Conditions
Output level	30mVrms	Vin = 10mV
regulator output	1V	Io = 5.0mA



TK10445M



TK10445V

Features

- Low voltage operation (0.9V~)
- High sensitivity. (3 $\mu$ V limiting)
- 1 volt regulator available.
- Data amp. available.

特 長

- 低電圧動作。(0.9V~)
- 高感度。(3 $\mu$ Vリミッティング)
- 1Vレギュレータ内蔵
- データアンプ内蔵

Specification

Item	Standard	Conditions
Current consumption	1.2mA	Vcc = 1.35V
Limiting sensitivity	3 $\mu$ V	at -3dB point
Operating frequency	~1.0MHz	

Item	Standard	Conditions
Output level	40mVrms	Vin = 10mV
regulator output	1V	Io = 10mA

## FM-IF &amp; Detection ICs for Communication Equipment 通信機用FM-FM検波IC



TK10447M

## Features

- Low voltage operation (1.0V~)
- HIGH frequency range. (~30MHz)
- High sensitivity. (2 $\mu$ V limiting)
- 1 volt regulator available.
- Dataamp. available.

## Specification

Item	Standard	Conditions
Current consumption	2.2mA	Vcc = 1.35V
Limiting sensitivity	2 $\mu$ V	at -3dB point



TK10447V

## 特 長

- 低電圧動作。(1.0V~)
- 動作周波数範囲が高い。(~30MHz)
- 高感度。(2 $\mu$ Vリミッティング)
- 1Vレギュレータ内蔵。
- データアンプ内蔵。

Item	Standard	Conditions
Output level	35mV	Vin = 10mV
regulator output	1V	Io = 10mA

## Compador ICs (Noise Reduction System) コンパンドIC(ノイズリダクションシステム)



TK10651M

## Features

- Low voltage operation: (2.4 to 7V).
- Built-in mike amp (Gain = 10 to 100 times).
- Built-in amp for splatter filter.
- Built-in data I/O terminals.
- Built-in IDC circuit.
- Mute can be controlled independently for both sending and receiving.
- Comes with through function.

## Specifications

Item	Standard	Conditions
Current consumption	4.0mA	Vcc = 3V
Compressor		
input level	12.5mVrms	Vout = 300mVrms
Gain deviation	$\pm 1$ dB	Vin = 300mVrms to -40dB



TK10651D

## 特 長

- 低電圧動作 (2.4V~7V)
- マイクアンプ内蔵。(GAIN = 10~100倍)
- スプラッタフィルタ用アンプ内蔵。
- データ入出力端子付。
- IDC回路内蔵。
- ミュートが送受独立にかけられる。
- スルー機能付。

Item	Standard	Conditions
Expander		
Output level	130mVrms	Vin = 30mVrms
Gain deviation	$\pm 1$ dB	Vin = 30mVrms to -30dB



TK10652M

## Features

- Low voltage operation: 2.7 to 9.0V.
- Wide dynamic range. (80dB, min.)
- Independent muting circuits for transmission and reception.
- Use of two independent op amplifiers.
- Low current consumption. (60 $\mu$ A at standby)
- Through function provided.
- High input and low output impedances.

## Specifications

Item	Standard	Conditions
Current consumption	4.5mA	
Compressor		
Output level	-24dBV	Vin = -23dBV
Total Harmonic Distortion	0.2%	Vin = -23dBV



TK10652L

## 特 長

- 低電圧動作 (2.7V~9.0V)
- ダイナミックレンジが広い (80dB以上)
- 送受信独立したミコート回路合成。
- 2個独立したオペアンプ内蔵。
- 消費電流が少ない (スタンバイ時60 $\mu$ A)
- スルー機能付
- 高入力・低出力インピーダンス

Item	Standard	Conditions
Expander		
Output Level	-21dBV	Vin = -23dBV
Total Harmonic-Distortion	0.2%	Vin = -23dB
Amp		
Gain	19.5~20.5dB	Vin = 30mVrms
Maximum Output Voltage	1.8Vrms	T.H.D. = 10%

Compondor ICs (Noise Reduction System) コンパンドIC(ノイズリダクションシステム)

TK10654M

Features

- Low voltage operation (2.4 to 7V)
- Terminal for Pre-emphasis available.
- Through function available.
- Built-in amp. for splatter filter.
- Built-in data I/O terminal.
- Mute can be controlled independently for both sides (compressor & expander).
- Built-in IDC circuit.

Specification

Item	Standard	Conditions
Current consumption	4.0mA	Vcc = 1.3V
Compressor		
Input level	12.5mVrms	
Gain deviation	±1dB	Vin = 300mVrms to-40dB

TK10654V

特長

- 低電圧動作 (2.4V~7V)
- プリエンファシス端子内蔵。
- スルー機能付き。
- スプラッターフィルター用アンプ内蔵。
- データ入出力端子付き。
- 送受信独立ミュート可能。
- IDC回路内蔵。

Item	Standard	Conditions
Expander		
Output level	130mVrms	Vin = 30mVrms
Gain deviation	±1dB	Vin = 30mVrms to-20

TK10650M

Features

- Built-in compressor and expander circuits.
- Wide operating voltage: Vopr = 3 to 7V.
- Low current consumption: Icc = 3.5mA, typ.
- Low standby current: Istby = 10μA, or less.
- Mic amplifier: total gain = ×10 to ×100.

TK10650D

特長

- コンプレッサ回路と、エキスパンダ回路を内蔵。
- 動作電源電圧範囲が広い (Vopr = 3~7V)
- 低消費電流 (Icc = 3.5mA typ)
- スタンバイ回路により消費電流低減 (Istby = 10μA以下)
- マイクアンプ内蔵 (Total Gain = 10~100倍)

TK10655M

Features

- Low voltage operation (2.4 to 7V)
- Terminal to control mic amp gain.
- Through function available.
- Built-in amp. for splatter filter.
- Built-in data I/O terminal.
- Mute can be controlled independently for both side. (compressor & expander).
- Built-in IDC circuit.

特長

- 低電圧動作 (2.4V~7V)
- マイクアンプのゲイン設定用の端子付き。
- スルー機能付き。
- スプラッターフィルター用アンプ内蔵。
- データ入出力端子付き。
- 送受信独立ミュート可能。
- IDC回路内蔵。

TK10752Q

Features

- FM-IF & Compondor system built in 1 chip
- FM-IF section: MIXER, LOCAL OSC, IF-amp., NOISE amp, SQUELCH
- Compondor section: compressor, expander, MUTE.
- DATA amp., IDC, amp. for Splatter filters.

特長

- FM-IF検波部とコンパンド部を1チップ
- FM-IF検波部としてミキサ・ローカルオシレータ・ノイズアンプ・スケッチ・RSSI内蔵。
- コンパンド部として、コンプレッサー・エキスパンダー・ミュート・データアンプ・リミッター・スプラッターフィルター用アンプ内蔵。

Specification

Item	Standard	Conditions
Current consumption	2.2mA	Vcc = 1.35V
Limiting sensitivity	2μV	at-3dB point

Item	Standard	Conditions
Output level	35mV	Vin = 10mV
regulator output	1V	Ic = 10mA

## Semiconductors &amp; ICs Applications (For Power Supplies) 電源半導体 用途別一覧

Type	Recommended uses				Circuits and functions	Operating voltage (V)	Package	Surface Mounting	Taping
	Audio	Car radios	Video equip.	Communications equip.					
Power Supplies	TK11420-55	●	●	●	Low saturation local regulator, small surface mounting type, output ON/OFF control terminal, applicable for 2.0 to 8.0 volts (0.5V steps), overcurrent protection circuit and overheating protection circuit 低飽和ローカルレギュレータ・小形面実装タイプ、出力ON/OFFコントロール端子付2~8.0V(0.5Vステップ)過電流保護回路・過熱保護回路付	2.5~12	SOT-23L	●	●
	TK11520-55	●	●	●	Low saturation local regulator with output ON/OFF control terminal, applicable for 2.0 to 8.0 volts (0.5V steps), overcurrent protection circuit and overheating protection circuit 低飽和ローカルレギュレータ・出力ON/OFFコントロール端子付2~8.0V(0.5Vステップ)過電流保護回路・過熱保護回路付	2.5~14	MFP-8	●	●
	TK11620-55	●	●	●	3 terminal regulator series, low saturation, applicable for 2 to 9.0V (in 0.5V steps) 3端子レギュレータシリーズ・低飽和・2~9.0V(0.5Vステップ)対応可能	2.5~14	TO-92		●
	TK11701M	●	●	●	Programmable regulator, low saturation, 1.5 to 9.25V (in 0.25V steps) optional output プログラマブルレギュレータ・低飽和・1.5V~9.25V(0.25Vステップ)任意出力	3.1~18	MFP-8	●	●
	TK10681/2M	●	●	●	Low saturation local regulator with output ON/OFF control, output 5V or variable, low level ON (681), high level ON (682M) 低飽和ローカルレギュレータ・出力[ON/OFF制御・出力5Vまたは可変・ローレベルON(TK10681M)/ハイレベルON(TK10682M)]	3.1~18	MFP-8	●	●
	TK10501M		●	●	Motor control IC, forward/reverse/idle/brake modes, speed control, low current consumption モータコントロールIC・正転・逆転・待機・ブレーキモード切替・スピードコントロール・低消費電流・過電流保護回路・過熱センサー回路内蔵	4~14	MFP-8	●	●
	TK10502M		●	●	Motor control IC, forward/reverse/idle/brake modes, speed control, low current consumption, Internal Thermal Shutdown & Short Circuit Protection available モータコントロールIC、正転・逆転・待機・ブレーキモード切替、スピードコントロール、低消費電流、過電流過熱保護回路内蔵。	4.4~14.0	MFP-8	●	●
	TK10503M		●	●	Motor control IC, forward/reverse/idle/brake modes, speed control, low current consumption, Internal Thermal Shutdown & Short Circuit Protection available, with PNP transistor low saturat operation can be available モータコントロールIC、正転・逆転・待機・ブレーキモード切替、スピードコントロール、低消費電流、過電流過熱保護回路内蔵。PNPトランジスタにて低飽和駆動可能。	4.0~14.0	MFP-14	●	●
	TK11806M, Z	●	●	●	DC/DC converter, output 1 channel, selectable between 9.3, 13, 17, 24, 28, 32V DC/DCコンバータ・出力1チャンネル・9.3, 13, 17, 24, 28, 32V選択可能	1.1~18	MFP-8, ZP-10	M	M
	TK11821M	●		●	DC/DC converter, fixed output 10V or 24V, low noise, for AM/FM/UHF band receiver DC/DCコンバータ・固定出力10Vor24V・ローノイズ・AM/FM/UHF帯受信用	0.9~10	MFP-8	●	●
	TK10468Z		●		Regular+ battery checker+ power amp. (will lcc cut) レギュレータ+バッテリーチェッカ+パワーアンプ (lccカット付)	2~6	ZP-10		
	TK10446M			●	Regulator system IC for Pager, 1V regulator+DATA amp. ページャー用レギュレータシステムIC。1Vレギュレータ、コンパレータ。	1.1~3.5	MFP-8	●	●

## Local Regulators (Surface Mounting) ローカル レギュレータ (表面実装用)



## TK114□□ Series

## Features

- Small difference between input and output voltages. (0.2V at 80mA)
- Low current consumption. (400 $\mu$ A at Iout=0mA and 2mA to Iout=60mA)
- Overcurrent protection provided.
- Overheating preventer provided.
- ON/OFF control possible for output voltage (0.1 $\mu$ A at output off).

## 特 長

- 入出力電圧差が小さい(0.2V at Iout 50mA)
- 低消費電流(500 $\mu$ A at Iout 0mA、2mA to Iout 60mA)
- 過電流保護回路内蔵。
- 過熱保護回路内蔵。
- 出力電圧ON/OFF制御可能(0.1 $\mu$ A at 出力OFF)

## Specifications

Type	TK114□□
Input Voltage Range	2.5 to 12V
No Load Input Current	500 $\mu$ A
Line Regulation	0.04%/V *1
Load Regulation	0.02%/mA *2
Output Current, Max.	70mA
Output Voltage	2.0 to 8.0 (0.5V steps)
Output Voltage Tolerance	Dependent on Output Voltage

\*1 Vin = (Vo + 1) ~ (Vo + 6)

\*2 Io = 0mA ~ 60mA



## TK115□□ Series

## Features

- Small difference between input and output voltages. (0.2V at Iout=80mA)
- Low current consumption. (400 $\mu$ A at Iout=0mA and 2mA to Iout=60mA)
- Overcurrent protection provided.
- Overheating preventer provided.
- ON/OFF control possible for output voltage (0.1 $\mu$ A at output off).
- Boost is possible at low saturation.

## 特 長

- 入出力電圧差が小さい(0.2V at Iout80mA)
- 低消費電流(500 $\mu$ A at Iout 0mA、2mA to Iout 60mA)
- 過電流保護回路内蔵。
- 過熱保護回路内蔵。
- 出力電圧ON/OFF制御可能(0.1 $\mu$ A at 出力OFF)
- 低飽和のままブースト可

## Specifications

Type	TK115□□
Input Voltage Range	2.5 to 14V
No Load Input Current	500 $\mu$ A
Line Regulation	0.02%/V *1
Load Regulation	0.01%/mA *2
Output Current, Max.	100mA
Output Voltage	2.0 to 8.0 (0.5V steps)
Output Voltage Tolerance	Dependent on Output Voltage

\*1 Vin = (Vo + 1) ~ (Vo + 6)

\*2 Io = 0mA ~ 60mA

## Local Regulators (3-Terminal) ローカルレギュレータ(3端子)



## TK116□□ Series

## Features

- Small difference between input and output voltages. (0.2V at  $I_{out}=80\text{mA}$ )
- Low current consumption. ( $400\mu\text{A}$  at  $I_{out}=0\text{mA}$  and  $2\text{mA}$  to  $I_{out}=60\text{mA}$ )
- Overcurrent protection provided.
- Overheating preventer provided.

## 特長

- 入出力電圧差が小さい(0.2V at  $I_{out}=80\text{mA}$ )
- 低消費電流( $400\mu\text{A}$  at  $I_{out}=0\text{mA}$ ,  $2\text{mA}$  to  $I_{out}=60\text{mA}$ )
- 過電流保護回路内蔵。
- 過熱保護回路内蔵。

## Specifications

Type	TK116□□
Input Voltage Range	2.5 to 14V
No Load Input Current	$400\mu\text{A}$
Line Regulation	$0.01\%/V$ *1
Load Regulation	$0.02\%/mA$ *2
Output Current, Max.	100mA
Output Voltage	2.0 to 9.0V (0.5V steps)
Output Voltage Tolerance	Dependent on Output Voltage

\*1  $V_{in} = (V_o + 1) \sim (V_o + 6)$ \*2  $I_o = 0\text{mA} \sim 60\text{mA}$ 

## Local Regulators (Surface Mounting) ローカルレギュレータ(面実装用)



## TK10681M

## Features

- Small difference between input and output voltages. (0.18V at  $I_{out}=75\text{mA}$ )
- Fixed output at 5V, or variable from  $1.5 - V_{in} - 0.7V$ .
- Wide operating voltages, 3.1 to 18V.
- Low standby current. ( $0.01\mu\text{A}$ )
- Direct drive of control terminals possible with use of a CMOS gate.



## TK10682M

## 特長

- 入出力電圧差が小さい。(0.18V at  $I_{out}=75\text{mA}$ )
- 出力電圧5V固定または  $1.5 - V_{in} - 0.7V$  可変。
- 最大出力電流が大きい。(150mA)
- 広い動作電圧。(3.1~18V)
- スタンバイ時消費電流が少ない。(0.01 $\mu\text{A}$ )
- コントロール端子はC-MOSゲートによる直接駆動可変。

## Specification

Item	Standard	Conditions
Current Consumption (during no load) (mA)	3.5	$V_{in}=18V$
Current Consumption (during standby) ( $\mu\text{A}$ )	0.01	control terminals

Item	Standard	Conditions
Line Regulation (mV)	100	$5.7V < V_{in} < 18V$
Load Regulation (mV)	150	$1.0\text{mA} < I_{out} < 150\text{mA}$
Ripple Reduction Ratio (dB)	45	$f=1\text{kHz}$

## Programmable Regulator プログラマブルレギュレータ



## Features

- Small difference between input and output voltages.
- Overcurrent protection provided.
- Short circuit protection provided.

## TK11701M

## 特長

- 入出力電圧差が小さい
- 過電流保護回路内蔵
- 出力短絡保護回路内蔵

## Programmable regulators

Type	TK11701M
Input Voltage Range	3.1 to 18V*
No Load Input Current	4mA
Input Regulation	7mV ( $V_{in}=3.1$ to 10V)
Load Regulation	150mV ( $I_{out}=1$ to 90mA)

\* Depends on power rating of packaging.

Type	TK11701M
Output Current, Max.	100mA
Output Voltage	1.5 to 9V (0.25V steps)
Output Voltage Tolerance	Dependent on output voltage

IC for Low Power Motor Control ローパワー可逆転モータコントローラIC

TK10501M

Features

- Stable load voltage is applied against variations in the supply voltage.
- Minimum current consumption, 0.15 $\mu$ A, TYP., at standby.
- Wide range of variable speed control—  
Maximum supply voltage:  
Up to 6V with variable resistor and internal reference voltage,  
or with Vcc = 1.5V using external reference voltage.
- CMOS drive is possible for the motor mode switching.
- Overheating sensor and overcurrent protection circuit built in.

特 長

- 電源電圧の変動に対し安全な負荷電圧を供給します。
- 待機時の消費電流が微小。(標準0.15 $\mu$ A)
- スピードコントロール範囲が大きく連続可変できます。  
モータへの最大供給電圧：可変抵抗と内蔵リファレンス電圧により6Vまで  
外部リファレンス電圧によりVcc = 1.5Vまで。
- モータのモード切り換えはCMOSドライブが可能。
- 過熱センサー、過電流保護回路内蔵。

Specifications

Item	Conditions
Operating Voltage Range	4 to 16V
Motor Driving Voltage	0 to 6V (with internal reference)
Motor Driving Current	150mA, max.

Item	Conditions
Current Consumption (at standby)	0.15 $\mu$ A, standard
Current Consumption (at braking)	8mA, standard
Reference Voltage	2.2V (Iout = 1 to 3mA)

ICs for Motor Drive カムコード用モータドライバIC

TK10502M

Features

- Four conditions, forward, reverse, braking, free run, controlled with TTL levels.
- Built in speed control circuit.
- Over load protection & thermal protection available.
- Low current consumption in control circuit; direct drive with C-MOS gate.
- Low stand-by current, Icc = 0.15 $\mu$ A (TYP)
- With the PNP transistor, low saturate operation can be use.

TK10503M

特 長

- 正逆転、ブレーキ、フリーの4値をロジックレベルでコントロールできる。
- スピードコントロール回路内蔵。
- 過電流、過熱センサ回路内蔵。
- コントロール回路電流が少なく、C-MOSゲートにて直接駆動できる。
- 待機時の電流はTYP = 0.15 $\mu$ Aと微小である。
- 外付けPNPトランジスタにて低飽和駆動可能。(TK 10503)

Type	TK10502M	TK10503M
Input. Voltage Range	4 to 14V	
Current Consumption	0.15 $\mu$ A	
Output Voltage Load-1	20mV	
Output Voltage Load-2	60mV	
Output Saturation Voltage	230mV	
Control logic level L	0.6V	
Control logic level H	2.4V	
Control logic	100 $\mu$ A	

## DC-DC Converters for VCD Drive DC-DCコンバータ



TK11806Z

## Features

- Wide input voltage range,  $V_{cc}$  1.1 to 18V.
- Two types of packaging available, MFP and Zip.
- Self-contained rectifier diodes.
- Six output voltages selectable, see table.

## Main Electrical Characteristics

(Ta = +25°C)

Item	TK11806 (M, Z)		
Output Voltage (V)	9.3	13	17
	26	28	30
Output Current (mA)	1.5		
Output Voltage Regulation (%)	0.24		



TK11806M

## 特長

- 動作電圧範囲が広い  $V_{cc}$  1.1~18V
- 2種類のパッケージを用意 MFP、Zip
- 整流ダイオード内蔵
- 出力電圧は9.3V、13V、17V、24V、28V、32Vより1出力任意選択

Item	TK11806 (M, Z)
Variable Output Voltage (V)	—
Osc. Starting Voltage (V)	1.1

## DC-DC Converters for VCD Drives DC-DCコンバータ



TK11821M

## Features

- Oscillating start-up voltage is low; 0.75V, typ.
- Oscillator frequency, 4MHz (since wave).
- Wide operating voltage range, 0.9 to 10V.
- Output voltage is selectable in the 10 to 24V range.

## Specifications

Item	Standard	Conditions
Oscillating start-up voltage (V)	0.75	I <sub>out</sub> = 0mA
Maximum output current (μA)	100	—

## 特長

- 発振開始電圧が低い TYP=0.75V
- 4MHzの発振周波数 (サイン波形)
- 動作電圧範囲が広い 0.9V~10V
- V<sub>out</sub> 10Vまたは24V選択出力

Item	Standard	Conditions
Output voltage fluctuation (%)	0.05	—

## Regulator + Battery Checker + Power Amplifier For Cordless Telephones

レギュレータ+バッテリーチェッカ+パワーアンプ



TK10468Z

## Features

- Regulator: Low saturation voltage.
- Battery checker: LED, with internal drive.
- Power amplifier: Minimum current requirement at cut-off condition.

## Specifications

Item	Standard	Conditions
Difference between input and output voltage	0.06V	Regulator Section
Voltage check	Variable	Battery checker

## 特長

- レギュレータ部: 低飽和電圧
- バッテリーチェッカ部: LEDドライバ内蔵
- パワーアンプ部: 電流カット回路内蔵で待機時の消費電流が微小。

Item	Standard	Conditions
Temperature coef.	0.47mV/°C	Battery checker
Voltage gain	34dB	Power Amplifier Section
Maximum output	45mW	

## 1V Regulator for Pager ペジャー用1Vレギュレータ



TK10446M

- Low voltage operation (1.1V~)
- 1V regulator and OP amp. built in one chip
- Precise output voltage within 1V ± 50mV

## Specifications

Item	TYP	Condition
Output Voltage 1	1.0V	V <sub>in</sub> = 1.10V, I <sub>o</sub> = 10mA
Output Voltage 2	1.0V	V <sub>in</sub> = 1.70V, I <sub>o</sub> = 0mA
Output Voltage 3	0.85V	V <sub>in</sub> = 0.9V, I <sub>o</sub> = 1mA
DATA AMP		
Input Impedance	100kΩ	
Output Vol	0.7VPP	

## 特長

- 低電圧動作 (1.1V~)
- 1バックにレギュレータとコンパレータ (OP AMP) を内蔵。
- 温特、ロードレギュレーション、電源変動を含め1V ± 50mVに入る。

Semiconductors & IC Applications (For Analog Switches) アナログスイッチ用半導体 用途別一覧

Type	Recommended uses					Circuits and functions	Operating voltage (V)	Package	Surface Mounting	Taping
	Audio	Car radios	Video equip.	Communications equip.	Production equip.					
Analog Switches	TK15021Z, M	●	●	●		2 circuit 2 position independent operation analog switch, low distortion ratio (0.005%), high I/O impedance 75k $\Omega$ , low output impedance 20 $\Omega$ 2回路2接点独立動作アナログスイッチ・低歪率(0.005%)・高入力インピーダンス75k $\Omega$ ・低出力インピーダンス20 $\Omega$	3~20	MFP-40, ZC-10	M	
	TK15022Z, M	●	●	●		2 circuit 2 position independent operation analog switch, low distortion ratio (0.005%), high I/O impedance 75k $\Omega$ , low output impedance 20 $\Omega$ 2回路2接点独立動作アナログスイッチ・低歪率(0.005%)・高入力インピーダンス75k $\Omega$ ・低出力インピーダンス20 $\Omega$	1.8~15	MFP-14, ZP-10	M	M
	TK15023Z	●	●	●		2 circuit 3 position (mute) analog switch, low distortion ratio (0.005%), high I/O impedance 75k $\Omega$ , low output impedance 20 $\Omega$ 2回路3接点(ミュート)アナログスイッチ・低歪率(0.005%)・高入力インピーダンス75k $\Omega$ ・低出力インピーダンス20 $\Omega$	1.8~16	ZP-10		
	TK15027M, Z	●	●	●		2 circuit interlock 2 position analog switch, low distortion ratio (0.005%), Output floating position (to make positions multiply) other features are the same as TK15021 2回路連動2接点アナログスイッチ・低歪率(0.005%)・高入力インピーダンス・接点数増設可能な出力フローティングポジション付・他の特性はTK15021と同等	1.8~15.0	MFP-14, ZIP-10	M	M
	TK15080D, M	●	●	●		2 circuit interlock 4 position analog switch, low distortion ratio (0.005%), high I/O impedance 75k $\Omega$ , low output impedance 20 $\Omega$ 2回路連動4接点アナログスイッチ・低歪率(0.005%)・高入力インピーダンス75k $\Omega$ ・低出力インピーダンス20 $\Omega$	1.8~16	DP-16, MFP-20	M	M
	TK15120M	●	●	●	●	2 circuit MUTE for audio signals, attenuation 86dB, low distortion ratio (0.0025%), possible to set ON/OFF time 2回路オーディオミュート用・減衰量86dB・低歪率(0.0025%)・オンオフ時間設定可	4.5~10	MFP-8	M	M
	TK15064Z	●	●	●		2 circuit 2 position independent analog switch (for video signals) 2回路2接点独立動作アナログスイッチ(ビデオ信号用)	5~10	ZP-10		
	TK15065Z	●	●	●	●	1 circuit 2 position independent analog switch (for video signals) 1回路2接点独立動作アナログスイッチ(ビデオ信号用)	4~7	ZP-10		
	TK15066Z	●	●	●	●	1 circuit 2 position independent analog switch (for video signals) 1回路2接点独立動作アナログスイッチ(ビデオ信号用)	4~7	ZP-10		
	TK15067M, Z		●	●	●	1 circuit 2 position independent analog switch (for video signals) 1回路2接点独立動作アナログスイッチ(ビデオ信号用)	4~7	MFP-8, ZP-10	M	M

Semiconductors & IC Applications (For Audio Equip.) オーディオ用半導体 用途別一覧

For Audio Equip.	TK10840M	●	●			TV audio MPX signal demodulator IC for headphone stereos (Japan), low voltage operation, automatic selection between monophonic and MPX, erratic operation preventer, PLL detection ヘッドホンステレオ用テレビ音声多重信号復調IC(日本)・低電圧動作・モノラル/多重自動判別・誤動作防止・PLL検波	0.9~5	MFP-20	●	●
	TK10850M	●	●			TV audio MPX signal demodulator IC for LC TVs (Japan), automatic selection between monophonic and MPX, erratic operation preventer, 1cc outoff 液晶TV用テレビ音声多重信号復調IC(日本)・モノラル/多重自動判別・誤動作防止・PLL検波・オートセーブコン・1ccカット	2.7~12	MFP-20	●	●
	TK10581M	●					1.6~6	MFP-20	●	●
	TK10585M	●				2 channel 3-element graphic equalizer for headphone stereos, low distortion (0.05%), $\pm 10$ dB control range, built-in ripple filter ヘッドホンステレオ用2ch3要素グラフィックイコライザ・低歪率0.05%・コントロールレンジ $\pm 10$ dB・リップルフィルタ内蔵	1.6~5	MFP-28	●	●
	TK10590M	●					1.0~3.6	MFP-30	●	●

## Analog Switch ICs (Audio Band) アナログスイッチ用IC(オーディオ帯域用)



TK15021M



TK15021Z



TK15022Z



TK15023Z



TK15080D

## Features

- Wide range of operating voltage.
- Switchable at the DC level.
- Low distortion: <0.005%.
- High input impedance: 75k $\Omega$ .
- Wide dynamic range, (4.5Vrms).
- Low output impedance: 20 $\Omega$ .

## 特長

- 動作電圧範囲が広い。
- コントロールはDCレベルにて行える。
- 歪率が良い。(0.005%)
- 入力インピーダンスが高い。(75k $\Omega$ )
- ダイナミックレンジが広い。
- 出力インピーダンスが低い。(20 $\Omega$ )



TK15120M

## TK15120M

- Large attenuation (TYP. -86dB).
- Selectable muting (ON/OFF time.)
- Maximum input voltage 5Vp-p.
- Grounded muting.

## TK15120M

- 減衰量が大きい。(Typ. -86dB)
- ミューティングON、OFF時間設定可能。
- 最大入力電圧5Vp-p
- GND接地ミューティング

## Analog Switch ICs (Video Band) アナログスイッチIC(ビデオ帯域用)



TK15067M



TK15064Z



TK15065Z



TK15066Z



TK15067Z

## Features

- Good frequency characteristics.
- Small switch insertion loss.
- Wide dynamic range.
- Little crosstalk.

## 特長

- 周波数特性が良い。
- スイッチ挿入ロスが少ない
- ダイナミックレンジが広い。
- クロストークが少ない

## Multiplex Sound Signal Demodulator for TV sets テレビ音声多重信号復調IC(日本国内用)

## JAPAN Channels



TK10840M



TK10850M

## Features

- Efficient operation possible with voltage as low as 0.9 volts.
- The PLL detection method is used in demodulating the sub-channel signal.
- A circuit for automatically discriminating the monophonic and multiplex sound signals is included.
- To prevent faulty operation of the discriminator, a 2-stage lock (capture range) automatic switchover circuit is used in addition to a discriminator level adjusting circuit.
- An operation amplifier for the subchannel signal selecting active filter has been included; this eliminates the need for an expensive external filter.

## 特長

- 減電特性に優れており、電源電圧0.9Vまで動作します
- 副チャンネル信号の復調にはPLL検波方式を採用
- モノラル/多重自動判別回路を内蔵。
- モノラル/多重自動判別の誤動作を防止するためにロック・キャプチャレンジ2段階自動切り換え回路及び多重判別レベル可変回路を内蔵
- 副チャンネル信号抽出アクティブフィルタ用オペアンプを内蔵。高価な外付けフィルタは不要

ICs for Audio Graphic Equalizer & Loudness Control グラフィックイコライザIC



Features

- Low voltage operation: 1.6 to 5V, TK10590M: 1.0 to 3.6V.
- 2-channel structure in mini-flat packaging for small space requirements.
- Low current consumption.
- Superior ripple rejection.

特長

- 低電圧動作: 1.6~5V (TK10590Mは1.0~3.6V)
- 2チャンネル構成のため省スペースでセットの小型化が可能
- アンプ・ジョーシェンが良し
- 低消費電力

Semiconductor & IC Applications 数値制御用半導体 用途別一覧

Type	Recommended uses					Circuits and functions	Operating voltage (V)	Package		Surface Mounting	Taping
	Audio	Car radios	Video equipment	Communications equipment	Production equipment						
Numerical Control LSI						For NC function generators (linear, arc, parabolic, index, logarithmic, interpolated) 454.5kpps (linear) 238.1kpps (and others) 数値制御 関数発生用 (直線, 円弧, 放物線, 指数, 対数, 補間) 454.5kpps (直線) 238.1kpps (その他)	5	DP-28			
						For NC positioning controller (DA pattern output) 8 to 16 bit variable, absolute coordinate detection 数値制御 位置制御用 (DAパターン出力8~16ビット可変, 絶対座標値検出)	+5	DP40 QFP-60	Q		
						For NC rotary encoder interface (output pulse: 1 to 4 increments) clock freq. 1.5MHz 数値制御 ロータリエンコーダインタフェース用 (出力パルス1~4週毎) ・クロック周波数1.5MHz	+5	DP-16			

LSI for Numerical Controls 数値制御用LSI



KM3701AD

Function Generator KM3701AD

We have developed a high-speed version of a function generator used for contour interpolation function in numerical control systems. This device distributes contour controlling command pulses at high-speed using the coordinate value and interpolation configuration data.

Features

- Adapted for miniaturization and low cost.
- Data accuracy is 24bit in length.
- On-line readout of present position.
- Control of fixed speed.
- End point determination.
- Direct interface with 8 bit CPU.
- Perfect TTL compatible input/output
- On-line data read-write
- Interrupt output
- Single TTL clock

Main Applications

- Function Generation: Linear, arc, parabola, exponential and logarithmic.
- Maximum settable Coordinate Value:  $\pm 8.388607m$  (at minimum settable unit =  $1\mu m$ )
- Interpolation Pulse and Tool Shift Speeds

関数発生用 KM3701AD

数値制御装置における輪郭制御機能として新たに高速・高精度を実現しました。座標値データ、補間パラメータによって、輪郭制御の指令パルスを高速で分配。

特長

- 装置の小型化とコスト低減
- 24ビット長のデータ精度
- 現在位置のオンライン読出し
- 一定速度制御
- 終点検出
- 8ビットCPU直接アドレスマейア
- 完全TTL・CMOSレベル入出力
- マーカリス・データリード/ライト
- オン・ラインデータ入出力
- 単一TTLクロック

主な仕様

発生関数: 直線, 円弧, 放物線, 指数, 対数  
最大設定座標値:  $\pm 8.388607m$  (最小設定単位:  $1\mu m$ として)  
補間パルス出力速度・ツールシフト速度

## LSI for Numerical Controls 数値制御用LSI



KM3702AD



KM3702AQ

## Position Controllers KM-3702AD and KM-3702AQ

These CMOS LSIs have been developed as position controllers for use in numerical control systems.

These devices control DC motors through the servo amplifier by generating D/A converter control signals which depend on differences between the interpolation pulse command and feedback inputs from an encoder.

## Features

- 32-bit length counter.
- Clock frequency: 10MHz max.
- Position zone setting (near zero): Select with 8 bits.
- Alarm zone setting (over-zone): Select with 8 bits.
- With command counter, readout of absolute coordinate values is possible.
- Detection of servo error.
- Data preset to the counter.
- Interrupt output.
- Direct interface with 8 bit CPU.
- Perfect TTL compatible input/output.
- + and -FB rotary encoder (functions of the KM3703D)
- Command counter comparison output terminal (only with the KM3702AQ).
- Hard reset for the command counter and error counter (only with the KM3702AQ)

## Main applications

Pattern output speed:  $2\mu\text{S}$  at clock frequency, 2MHz.

Saturation zone setting: Select with 8 to 16 bits.

## 位置制御用 KM3702AD, KM3702AQ

数値制御装置の位置制御用として開発したCMOS LSIです。

補間パルスによる指令入力とエンコーダからのフィードバック入力の偏差に応じて、D/A変換器制御信号を発生し、サーボアンプ回路をへてDCモータを制御。

## 特 長

- 32ビット長カウンター
- クロック周波数最大10MHz
- ポジション・ゾーン(ゼロ近傍検出)の設定: 8ビットで選択。
- アラーム・ゾーン(オーバ・レンジ)設定: 8ビットで選択。
- コマンド・カウンタにより絶対座標値を読出可能。
- サーボ・エラー検出。
- カウンタへのデータプリセット。
- インターラプト出力。
- 8ビットCPU直接インターフェース。
- 完全TTL・コンパチブル入出力。
- ±FBロータリエンコーダ(KM3703Dの機能)
- コマンドカウンタとの比較出力端子(KM3702AQのみ)
- コマンドカウンタ・エラーカウンタのハードリセット(KM3702AQのみ)

## 主な仕様

パターン出力速度:  $2\mu\text{S}$  (クロック周波数2MHz)

サチレーション・ゾーンの設定: 8~16ビット選択。



KM3703D

## Rotary encoder Interface KM-3703D

This CMOS LSI is designed for two phased incremental type rotary encoders used in numerical control systems.

Using two signals from an encoder which have a phase difference of 90 degrees, this device detects the direction and is used as an interface for general-purpose rotary encoders with one, two and four times the pulse multiplication circuit.

## Features

- Output pulses, single, double and quadruple, can be selected as required.
- TTL drive is possible.

## Main Applications

- Clock frequency: 1.5MHz, maximum.

## ロータリ・エンコーダ・インタフェース用 KM3703D

数値制御装置の2相インクリメンタル型ロータリ・エンコーダ用として設計したCMOS LSIです

エンコーダから得られる90度位相差のある2信号によって方向判別、1倍・2倍・4倍パルス通信回路を持つ汎用形ロータリ・エンコーダのインタフェースです

## 特 長

- 出力パルスは、1・2・4通信を任意選択可能。
- TTLドライブ可能

## 主な仕様

クロック周波数: 最大1.5MHz

Switch Applications スイッチ 用途別一覧

Class \ Type \ Application			Audio Equip.			Video Equip.										Comment
			Radios	Radio cassettes	Stereos	TVs	VCRs/VTRs	OA equip.	FA equip.	Computer peripherals equip.	Measurement equip.	Communication equip.	Medical equip.	Household appliances		
For signals	Push	F	●	●	●	●	●	●	●	●	●	●	●	●	General use	
		FO	●	●	●	●	●							Light operation		
		FU						●	●	●	●	●	●	Au plated contacts		
		TF	●	●	●	●	●							Stroke 2.5mm		
		TM	●	●	●	●	●							Stroke 2mm		
For power switches	Push	NE15-DD NE15-DS NE15-RD NE15-RS	●	●	●	●	●	●	●	●	●	●	●	AC 250V 4A		
		TPS						●	●	●	●	●	●	1 Circuit 250V AC 3A		
		TPD						●	●	●	●	●	●	2 Circuit 240V AC 3A		
For key board switches	Unit key	R-7000	●	●	●	●	●	●	●	●	●	●	●	Rubber contacts	Keytop types available	
		R-8000	●	●	●	●	●	●	●	●	●	●	●		With keytops	
		R-22						●	●	●	●	●	●		Rocker types	
		WR-70						●	●	●	●	●	●	Metal contacts	Keytop types available	
		M-6000	●	●	●	●	●	●	●	●	●	●	●		Vertical types	
		MV-6000	●	●	●	●	●	●	●	●	●	●	●		Waterproof types	
		MS-6000	●	●	●	●	●	●	●	●	●	●	●			
	* Disc	MD						●	●	●	●	●	●	●	Ag/Au available	
		MDP						●	●	●	●	●	●	●	With keytop	
		MDPL						●	●	●	●	●	●	●	Keytop types available	
		DMB						●	●	●	●	●	●	●	LED types available	
		TFD						●	●	●	●	●	●	●	With keytops	
	* Digitast	SR (ST)						●	●	●	●	●	●	●	With keytops	
		SER (SET)						●	●	●	●	●	●	●	LED indicator types available	
		REK						●	●	●	●	●	●	●		
	* Unit key	KSA	●	●	●	●	●	●	●	●	●	●	●	●	Waterproof types	
		KSC	●	●	●	●	●	●	●	●	●	●	●	●	SMT	
		KSF	●	●	●	●	●	●	●	●	●	●	●	●	Waterproof types	
		K12						●	●	●	●	●	●	●	Round types	
		MSL						●	●	●	●	●	●	●	With keytops	
	* DIP	CDB						●	●	●	●	●	●	Waterproof types, Ag contacts		

Import Switches (ITT)

\* KEY-BOARD S.W. (Disc/Digitast/Unity DIP Type); Available in Japan only.

\*キーボードスイッチ(ディスク/デジタスト/ディップタイプ):日本国内向。

## Switches スイッチ

## Signal Switches 信号用スイッチ

Class	Type	Rating	Number	Contact Resist (mΩ)	Stroke (mm)	Terminal Pitch (mm)	Switch Timing			Operating Force (gf)	Life (cycles)	Chassis		Dimensions
							Non-shorting	Shorting	Mating			Key Pitch (mm)	No. of Keys	
For Signal	Push Type	F	100V AC 0.5A 25V DC 1A	2, 4, 6 8, 10	6	3.2	●	●		2 Pole: 600	25,000	10	1	10
		FO	40V DC 0.3A				●	●		2 Pole: 300		12.5		
		FU (AU Contact)	30V DC 0.1A	2, 4, 6 8, (10)	50		●			2 Pole: 600	10,000	15		
		TF for Sig. current	40V DC 0.3A	2, 4, 6	30	2.5	●	●	●	2 Pole: 250		17.5		
		TF for medium	25V DC 1A	2, 4			●	●				20		
	TM		30V DC 0.1A	2, 4	20	2	2.5	●	●	2 Pole: 170	30,000	10	(W) (D)	19.4 × 12.9
	Rocker Type	TPSU Au Contact	50V DC 0.1A	SPST SPDT	50	—	7.1			400	50,000	12.5		





F, FO, FU





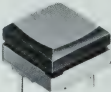
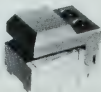
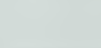
TM

## Power Switches 電源スイッチ

Class		Type	Rating	Number	Insulation Resistance (mΩ)	Stroke (mm)	Operating Force (gf)	Safety Standard Approval							Dielectric Test (V)	Inrush Curr. (A)	Life (cycles)	Dimensions
								U L	C S A	V D E	S E V	B S I	S E M K O	N E M K O				
For Power	*1 Push Type	NE15-DD	250V AC 4A	DPDT	1000	3.2	800	●	●	●	●	●	●	●	UL 1000	IEC 24	UL 6,000	 <b>NE15DD</b>  <b>TPD</b>
		NE15-DS		SPDT				●	●	●	●	●	●					
		NE15-RD		SPST				●	●	●	●	●	●					
	Rocker Type	TPS-10, -30		250V AC 3A 125V AC 5A				SPST	500	—	400	●	●	●				
TPS-20		SPDT	●		●	●	●	●										
TPD-10, -30		DPST	●		●	△	●	●				●						







△ : Pending

## Keyboard, DIP Switches (\*2: Available in Japan, only) キーボードスイッチ・ディップスイッチ(\*2: 日本国内向け)







Class	Contact	Type	Rating	Number of Poles	Contact Resist	Stroke (mm)	Dimensions (mm)			Operating Force (gf)	Life (cycles)	P.C.B. Mount Pitch (mm)	Remarks	Dimensions				
							W	D	H									
Key-board Switch	Unit Key	Rubber	R-7000	6V DC 10mA	1 × 1	1kΩ	1	7	7	7, 10	90	1 × 10 <sup>5</sup>	5.5	Available with keytop	 <b>R-7000</b>			
			R-8000	15V DC 5mA	1 × 1, 2		8	8	12	180	10							
			R-22	30V DC 5A			12.6	12.6	10.3	70	11.35							
		Metallic	WR-70	6V DC 10mA	1 × 2	22	10.6	13.8	160	13 × 5.5	Rocker type							
			M-6000	12V DC 50mA	1 × 1	10mΩ	0.25	6	6	4.3 5.7 9.5	100 160		4.5 × 6.5	With key top H = 7.3mm Plunger: Square				
			MV-6000					(4.5)	Vertical type									
	MS-6000	7.62 × 5.08	Waterproof type					 <b>M-6000</b>										
	*2 Disc	Metallic	Ag	MD	100V DC Ag 100mA Au 50mA	1 × 1	Ag Cont. 10mΩ		0.6	12.7	12.7	5	240	Ag 1 × 10 <sup>4</sup> Au 5 × 10 <sup>4</sup>	(11.36)	With keytop	 <b>MDP</b>	
			Au															
			Ag															
			Ag	MDP					0.3	7.6	Au/Ag 1 × 10 <sup>3</sup>							
			Ag	MDPL					0.6	12.6	19.1	8.5		200				Ag 2 × 10 <sup>3</sup>
			Au	DMB				1	15	19.8	10.5	180		Au 2 × 10 <sup>4</sup>				With Keytop
	Ag	TFD	1.5	18	18	21.8	150	Ag/Au 5 × 10 <sup>4</sup>	 <b>SER</b>									
	*2 Digitast	Au	SR (ST)	24V DC 10mA	1 × 2	50mΩ	2	12.3 (17.3)	17.1	13.8 14.3	150	Ag 1 × 10 <sup>4</sup>	5.08 × 7.62	With keytop: LED also available				
			SER (SET)									Au 2 × 10 <sup>5</sup>						
			REK					25V DC 10mA		1 × 1		150mΩ				1.5	12.5	14
		Ag	KSA	50V DC 50mA	1 × 1	50mΩ	0.3	7.4	7.4	4.8	130	3 × 10 <sup>5</sup>						
			KSC			100mΩ	0.3	6.2	6.2	2.7	160	1 × 10 <sup>5</sup>	SMT					
			KSF			50mΩ	0.3	7.4	7.4	2.6	160	3 × 10 <sup>5</sup>	Low profile					
	*2 Unit Key	MSL	12V DC 30mA	1 × 1	50mΩ	1.5	12.5	14.3	9.7	220	1 × 10 <sup>5</sup>	With Keytop						
					K12	28V DC 100mA	1 × 1	50mΩ	2	φ12	11	250	1 × 10 <sup>5</sup>					
Ag		CDB-G	50V DC 200mA	2 ~ 10 × 1	(50°)	7.7	6.62 ~ 26.64	5.08	150	Ag 2 × 10 <sup>5</sup>	2.54 × 9	Waterproof type: Ag contacts						
		CDB-L			(40°)			6.58	250									
	CDB-V				8			200										

Polyvaricons: General Specifications ポリバリコン一般仕様


16mm Square Polyvaricons

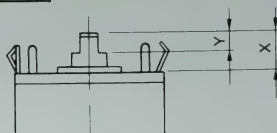
Use	Type No.	No. of Sections	Capacitance, max. (pF)	Tolerance	Capacitance, min. (pF)	Trimmer (pF)	Cap. Coef. see curves	Torque (g · cm)	Dimensions, W × L × H, (mm)
FM/AM	<b>HP-22125-R</b> 	AM-2 FM-2	(OSC 82 ANT 160 20 or (40)	$\pm (2\text{pF}+2\%)$ $\pm 1\text{pF}$	5.0 5.5 $\pm 1$ 4.7 5.4 $\pm 1$	8 $\pm 3$	1b 1a 4c	30 ~ 250	16 × 16 × 5.7
	<b>HD-22125/HD-22125-R</b> 	AM-2 FM-2	(OSC 82 ANT 160 20	$\pm (1\text{pF}+2\%)$ $\pm (0.4\text{pF}+2\%)$	5.4 5.1 $\pm 1$ 4.3 4.7 $\pm 1$	8 $\pm 3$	1b 1a 4c	30 ~ 250	16.4 × 16.4 × 8
	<b>HD-22124/HD-22124-R</b> 	AM-2 FM-2	(OSC 82 ANT 140 20	$\pm (1\text{pF}+2\%)$ $\pm (0.4\text{pF}+2\%)$	5.5 5.4 $\pm 1$ 4.5 4.7 $\pm 1$	8 $\pm 3$	1b 1a 4c	30 ~ 250	16.4 × 16.4 × 8
	<b>HU-22125/HU-22125-R</b> 	AM-2 FM-2	(OSC 82 ANT 160 20 or (40)	$\pm (1\text{pF}+2\%)$ $\pm (0.4\text{pF}+2\%)$	4.5 4.1 $\pm 1$ 3.7 3.9 $\pm 1$	8 $\pm 3$	1b 1a 4c	20 ~ 250	16.4 × 16.4 × 9 Rear mtg H: 9.2
	<b>HU-22124/HU-22124-R</b> 	AM-2 FM-2	(OSC 82 ANT 140 20 or (40)	$\pm (1\text{pF}+2\%)$ $\pm (0.4\text{pF}+2\%)$	4.2 4.3 $\pm 1$ 4.0 4.3 $\pm 1$	8 $\pm 3$	1b 1a 4c	30 ~ 250	16.4 × 16.4 × 9 Rear mtg H: 9.2
FM	<b>HU-201/HU-201-R</b> 	FM-2	20 or (40)	$\pm (0.4\text{pF}+2\%)$	3.0 3.3 $\pm 1$	8 $\pm 3$	4c	30 ~ 250	16.4 × 16.4 × 6.3 Rear mtg H: 6.5

20mm Square Polyvaricons

FM/AM	<b>SE-22125</b> 	AM-2 FM-2	(OSC 82 ANT 160 20 or (40)	$\pm (1\text{pF}+1\%)$ $\pm 0.5\text{pF}$	4.2 $\pm 1$ 4.0 $\pm 1$	8 $\pm 3$	1b 1a 4c	200 $\pm$ 150	21 × 21 × 20
	<b>SE-22124</b> 	AM-2 FM-2	(OSC 82 ANT 140 20 or (40)	$\pm (1\text{pF}+1\%)$ $\pm 0.5\text{pF}$	3.8 $\pm 1$ 3.7 $\pm 1$	8 $\pm 3$	1b 1a 4c	200 $\pm$ 150	21 × 21 × 20
	<b>FE-22125/FE-22125-R</b> 	AM-2 FM-2	(OSC 82 ANT 160 20 or (40)	$\pm (1\text{pF}+1\%)$ $\pm 0.5\text{pF}$	4.2 $\pm 1$ 4.0 $\pm 1$	8 $\pm 3$	1b 1a 4c	200 $\pm$ 150	21 × 21 × 17 Rear mtg H: 18.5
	<b>FE-22124/FE-22124-R</b> 	AM-2 FM-2	(OSC 82 ANT 140 20 or (40)	$\pm (1\text{pF}+1\%)$ $\pm 0.5\text{pF}$	3.8 $\pm 1$ 3.7 $\pm 1$	8 $\pm 3$	1b 1a 4c	200 $\pm$ 150	21 × 21 × 17 Rear mtg H: 18.5
FM/AM Multi band	<b>ST-2217</b> 	AM-2 FM-2	335 20 or (40)	$\pm (1\text{pH}+1\%)$ $\pm 0.5\text{pF}$	5.0 4.7 $\pm 1$ 4.4 4.7 $\pm 1$	8 $\pm 3$	1a 4c	200 $\pm$ 150	21 × 21 × 23.5
	<b>FT-2217/FT-2217-R</b> 	AM-2 FM-2	335 20 or (40)	$\pm (1\text{pF}+1\%)$ $\pm 0.5\text{pF}$	5.0 $\pm 1.5$ 4.7 $\pm 1$	8 $\pm 3$	1a 4c	200 $\pm$ 150	21 × 21 × 20.5 Rear mtg H: 22.0

## Standard Type List 標準タイプリスト

AM / FM Multi-band	No. of Stage		Capacitance max. (pF) (最大可変容量)			AM
	FM	AM	ANT	140	160	335
			OSC	82	82	335
	2	2	HU-22124 HD-22124 FE-22124 SE-22124	HU-22125 HD-22125 FE-22125 SE-22125 HP-22125	FT-2217 ST-2217	20 or 40  Capacitance max. (pF)
FM	FM		ANT	20 or 40		
			OSC	20 or 40		
	2		HU-201			



### • Standard Length of shaft

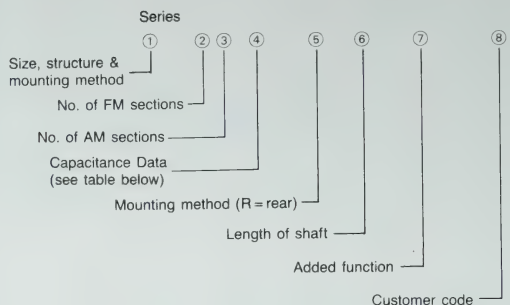
(標準シャフト長さ) (unit: mm)

Mount	20mm Type	16mm Type
Monount	FE, FT	HU, HS
Self Rear	N (4/2) M (6/3) L (10/6)	H (2/1.5) S (2.5/2) K (4/3) N (4/2) *2M (1/0.8)
Dip	SE, ST S (3/3)	—

Note: \*2M Shaft is effective for HP-22125 type only

## Product Coding Example:

FE- 22124- R N 0 0 0 - 0



(1) : Series	Ext. Dim. (mm)	Dielectric		Mounting Method		
		Laminated	Poly-film	Dipping	Self-Supporting	Rear Mounting
SE	20	○		○		
FE	20	○			○	- R (5)
ST	20		○	○		
FT	20		○		○	- R (5)
HD	16		○		○	- R (5)
HU	16		○		○	- R (5)
HP	16	○				- R (5)

## Capacitance Characteristics

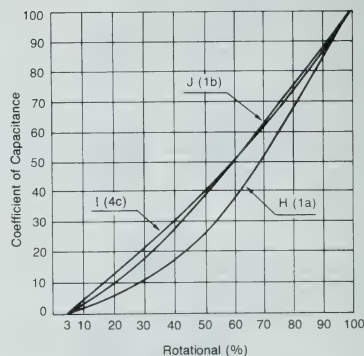
Symbol	1	2	3	4	5	6	7	A
Capacitance, pF	20	82	—	140	160	—	335	40

Note: Typical characteristics are given. When ordering, please confirm.

Index %	100	90	80	75	70	60	50	40	30	25	20	10	3
Symbol	1a	1b	4c	1a	1b	4c	1a	1b	4c	1a	1b	4c	1a
1a	100.00	84.40	67.90	60.00	52.30	38.00	26.20	17.00	10.20	7.57	5.31	1.74	0.00
1b	100.00	90.00	78.10	71.80	65.20	51.70	38.80	27.20	17.40	13.30	9.60	3.30	0.00
4c	100.00	86.18	73.37	67.32	61.48	50.42	40.12	30.50	21.52	17.25	13.11	5.23	0.00












Note: EIAJ equivalents, H = 1a, I = 4c, J = 1B

## Capacitance Curves






























Single Output Switching Power Supplies for Mounting in Equipment

単一出力 スイッチング電源 用途別一覧

Output Power (W)	Standard product type name	Input voltage (V)				Output voltage (V) and Output current (A)								Safety Standards	Noise Provisions "FCC Class"	Usable equipment									
		100 AC	200 AC	100/200 AC	85 ~ 264 AC	5 V D C	6 V D C	9 V D C	12 V D C	15 V D C	18 V D C	24 V D C	OA equipment			FA equipment	Peripheral equipment	Communication equipment	Security equipment	Automatic vending machines	Display equipment	Measuring equipment	Testing equipment	Inspection equipment	Medical equipment
7.5	FS7R5	●				1.5	1.25	—	0.63	0.5	0.42	0.32		B	●		●	●	●	●	●	●	●	●	●
	FU7R5		●											B											
10	PS10	●				2.0	1.7	—	0.9	0.7	0.6	0.5		B	●	●	●	●	●	●	●	●	●	●	●
	PU10		●											B											
15	PS15	●				3.0	2.5	—	1.3	1.0	0.9	0.7		B	●	●	●	●	●	●	●	●	●	●	●
	PU15		●											B											
30	PS30	●												B											
	PU30		●			5.5	4.7	—	2.5	2.0	1.7	1.3		B	●	●	●	●	●	●	●	●	●	●	●
	PE30			●										B											
50	PS50	●												A											
	PU50		●			10	8.4	—	4.2	3.4	2.8	2.1		A	●	●	●	●	●	●	●	●	●	●	●
	PE50			●										A											
100	PS100	●				20	16.6	—	8.3	6.6	5.6	4.2		A	●	●	●	●	●	●	●	●	●	●	●
	PE100			●										A											
	FS100	●				20	—	—	8.3	6.6	5.6	4.2		A	●	●	●	●	●	●	●	●	●	●	●
150	MK150	●				30	25	—	12.5	10	8.4	6.3		B	●	●	●	●	●	●	●	●	●	●	●
	MU150		●																						
6	J-DC	12, 24DC ±20%				1.2	—	—	0.5	—	—	0.25				●	●	●	●	●		●	●	●	●
10	S-DC	12DC ±20%				2.0	—	1.1	0.83	0.67	—	0.42				●	●	●	●	●		●	●	●	●
15	S-DC	24DC ±20%				3.0	—	1.67	1.25	1.0	—	0.63				●	●	●	●	●		●	●	●	●
17	H-DC	12, 24DC ±20%				3.4	—	—	1.42	—	—	0.71				●	●	●	●	●		●	●	●	●

## Multi-Output Switching Power Supplies for Mounting in Equipment

多出力 スイッチング電源 用途別一覧

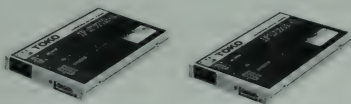
Output Power (W)	Standard product type name	Input voltage (V)				Output voltage (V) and Output current (A)				Safety Standards	Noise Provisions "FCC Class"	Usable equipment											
		100 AC	200 AC	100 / 200 AC	85 ~ 264 AC	V1 / 11	V2 / 12	V3 / 13	V4 / 14			OA equipment	FA equipment	Peripheral equipment	Communication equipment	Security equipment	Automatic vending machines	Display equipment	Measuring equipment	Testing equipment	Inspection equipment	Medical equipment	
7.5	FT7R5	●				+ 5/1.0	+ 12/0.1	- 12/0.1			B	●			●	●	●	●	●	●	●	●	
	FM7R5		●			+ 5/1.0	+ 12/0.1	- 15/0.1				●		●	●	●	●	●	●	●	●	●	●
10	ET10	●				+ 5/1.0	+ 12/0.3	- 12/0.1			B	●	●	●	●	●	●	●	●	●	●	●	
	EM10		●			+ 5/1.0	+ 15/0.3	- 15/0.1				●	●	●	●	●	●	●	●	●	●	●	●
15	ET15	●				+ 5/2.0	+ 12/0.3	- 12/0.2			B	●	●	●	●	●	●	●	●	●	●	●	
	EM15		●			+ 5/2.0	+ 15/0.3	- 15/0.2				●	●	●	●	●	●	●	●	●	●	●	●
	PT15	●				+ 5/2.0	+ 12/0.3	- 5/0.2			B	●	●	●	●	●	●	●	●	●	●	●	
	PD15	●				+ 12/1.2	—	- 5/0.1				●	●	●	●	●	●	●	●	●	●	●	●
17.5	MW15				●	+ 5/3.0	+ 12/0.5	- 12/0.5		 	B	●	●	●	●	●	●	●	●	●	●	●	
	LW15				●	+ 5/3.0	+ 15/0.5	- 15/0.5				  	VDE B										
30	PT30	●				+ 5/3.0	+ 12/1.0	- 12/0.3			B	●	●	●	●	●	●	●	●	●	●	●	
						+ 5/3.0	+ 15/0.7	- 15/0.3															
						+ 5/3.0	+ 12/1.0	- 5/0.3															
31	MW30				●	+ 5/5.0	+ 12/1.2	- 12/0.5		 	B	●	●	●	●	●	●	●	●	●	●	●	
	LW30				●	+ 5/5.0	+ 15/1.2	- 15/0.5				  	VDE B										
50	PT50	●				+ 5/5.0	+ 12/1.0	- 12/1.0			A	●	●	●	●	●	●	●	●	●	●	●	
51	MW50			●		+ 5/8.0	+ 12/1.5	- 12/1.0		 	B	●	●	●	●	●	●	●	●	●	●	●	
	LW50			●		+ 5/8.0	+ 15/1.5	- 15/1.0				  	VDE B										
						+ 5/8.0	+ 12/1.5	- 5/1.0															
75	PT75	●				+ 5/10	+ 12/1.0	- 12/1.0			A	●	●	●	●	●	●	●	●	●	●	●	
						+ 5/9.0	+ 12/2.0	- 12/0.5															
						+ 5/9.0	+ 15/1.0	- 15/1.0															
100	PT100	●				+ 5/12	+ 12/3.0	- 12/0.5			A	●	●	●	●	●	●	●	●	●	●	●	
	MW100			●		+ 5/12	+ 24/2.0	+ 12/2.0	- 12/1.0	 	A	●	●	●	●	●	●	●	●	●	●	●	
	LW100		●			+ 5/12	+ 12/2.0	- 12/2.0	—			  	VDE A										
						+ 24/3.0	+ 12/2.0	+ 5/2.0	- 12/1.0														

## Switching Power Supplies (For Mounting in Equipment) スイッチングパワーサプライ(機器組込型電源)

## FS7R5 &amp; FU7R5 Series (7.5W)

Standard Single Output

UL1950 Approved (FS7R5 Type)

W: 1/2 inch  
on card

## Features

- Slender body: Thickness of half an inch (12.7mm) makes this power supply only half as thick as its predecessor.
- Mounting versatility: Can be mounted vertically, horizontally, or on card.
- Compact: Volume of 0.1 liter is only 48% that of the previous model.

## 特長

- 厚さ1/2インチ(12.7mm)の薄形電源。
- 実装自由: タテ置き、ヨコ置き、オンカード実装可。
- 小形: 体積0.1ℓは、従来品の48%。(当社比)

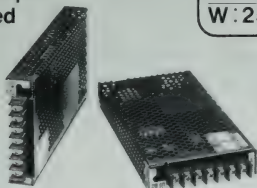
Input Voltage: FS7R5 85~132V AC  
FU7R5 170~264V AC

Model		Rated Power (W)	Rated Voltage (V)	Rated Current (A)	Over-Voltage Protection <(V)>	Dimensions H x L x W (mm) Wt: F Type (g)
100V AC	200V AC					
FS7R5-05	FU7R5-05	7.5	5	1.5	6.9	70 x 120 x 12.7 (160g)
FS7R5-06	FU7R5-06	7.5	6	1.25	8.0	
FS7R5-12	FU7R5-12	7.56	12	0.63	15.5	
FS7R5-15	FU7R5-15	7.5	15	0.5	20.0	
FS7R5-18	FU7R5-18	7.56	18	0.42	24.0	
FS7R5-24	FU7R5-24	7.68	24	0.32	31.0	

## FS100 Series (100W)

Standard Single Output

UL478 Approved

0.42 ℓ  
W: 25mm

## Features

- Low-profile: 25mm thickness makes it just half the size of our previous model.
- Compact: 0.421 volume is 42% that of its predecessor.
- High frequency design: Switching frequency of 430kHz.

## 特長

- 薄形: 厚さ25mmは従来品の1/2 (当社比)
- 小形: 体積0.42ℓは、従来品の42% (当社比)
- 高周波設計: スイッチング周波数430kHz

Input Voltage: 85~132V AC

Model	Rated Power (W)	Rated Voltage (V)	Rated Current (A)	Over-Voltage Protection <(V)>	Dimensions H x L x W (mm) Wt: F Type (g)
FS100-05	100.0	5	20.0	6.9	97 x 175 x 25 (600g)
FS100-12	99.6	12	8.3	15.5	
FS100-15	99.0	15	6.6	20.0	
FS100-18	100.8	18	5.6	24.0	
FS100-24	100.8	24	4.2	31.0	

## PE Series (30, 50, 100W)

Standard Single Output 100V/200V AC (Selector provided)



Safety standards: VDE0806

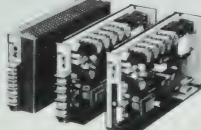
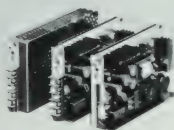


PE SERIES

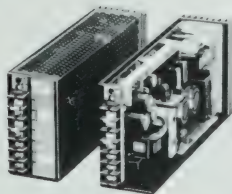
PE30



PE50



PE100



## Features

- Adapted for line voltage at 100V or 200V systems (selector provided).
- Choice of variation in structure  
Open frame or with case.  
Barrier strip terminals, connectors or other forms on order.
- Safety standard VDE0806
- Noise: conforms with FCC and CISPR requirements.
- Series operation is possible.

## 特長

- ワイドな入力電圧(AC100V系・AC200V系)が選択可能
- 構造: ワイト・ハット・オープン・オープンフレーム、ケース付  
入出力端子は端子台、コネクタ等の対応も可能
- 安全規格VDE0806認定品
- 雑音規格FCC、CISPR 対応設計
- 直列運転可能

Input Voltage: 85~132V/170~264V AC  
(selector provided)

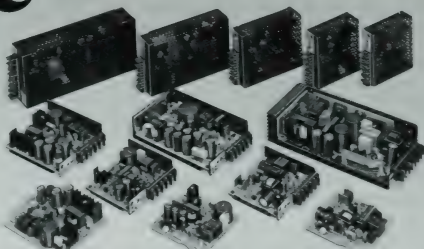
Type	Model	Rated Power (W)	Rated Voltage (V)	Rated Current (A)	Over-Voltage Protection <(V)>	Dimensions H x L x W (mm) Wt: F Type (g)
PE30 2830	PE 30-05	27.5	5	5.5	6.9	97 x 160 x 35 (440g)
	PE 30-06	30.0	6	5.0	8.0	
	PE 30-12	30.0	12	2.5	15.5	
	PE 30-15	30.0	15	2.0	20.0	
	PE 30-18	30.6	18	1.7	24.0	
	PE 30-24	31.2	24	1.3	31.0	
PE50 2831	PE 50-05	50.0	5	10.0	6.9	97 x 180 x 41 (500g)
	PE 50-06	50.4	6	8.4	8.0	
	PE 50-12	50.4	12	4.2	15.5	
	PE 50-15	51.0	15	3.4	20.0	
	PE 50-18	50.4	18	2.8	24.0	
	PE 50-24	50.4	24	2.1	31.0	
PE100 2832	PE100-05	100.0	5	20.0	6.9	97 x 230 x 50 (950g)
	PE100-06	99.6	6	16.6	8.0	
	PE100-12	99.6	12	8.3	15.5	
	PE100-15	99.0	15	6.6	20.0	
	PE100-18	100.8	18	5.6	24.0	
	PE100-24	100.8	24	4.2	31.0	

## PS & PU Series (10,15, 30, 50, 100W)

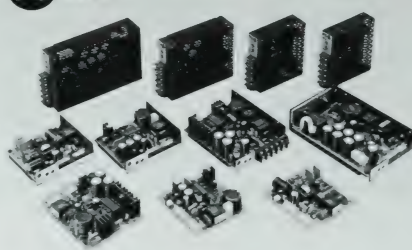
### Standard Single Output

**UL478 Approved (PS Type)**

### PS SERIES



### PU SERIES



#### Features

- Thin and compact; low cost.
- Designed for superior cost performance.
- Wide choice for specific requirements.
- High quality and high reliability built-in to meet international safety standards.
- Safety Standards: UL478 acquired; also conforms to CSA.
- Designed to comply with FCC and CISPR noise standards.
- Series operation is possible.

#### 特 長

- 小形、薄形、低価格
- コストパフォーマンスを究めた設計
- 使う立場に立ったワイドバリエーション
- 国際安全規格で器かれた高品質、高信頼性
- 安全規格(電取、CSA)対応設計
- UL478取得(PS Type)
- 雑音規格(FCC、CISPR)対応設計
- 直列運転可能

**Input Voltage: PS 85~132V AC, 110~175V DC**  
**PU 170~264V AC, 220~350V DC**

Model		Rated Power (W)	Rated Voltage (V)	Rated Current (A)	Over-Voltage Protection <(V)	Dimensions H x L x W (mm) Wt: F Type (g)
100V AC	200V AC					
PS 10-05	PU 10-05	10.0	5	2.0	none	Open frame, with barrier strip 97 x 90 x 26 (260g)
PS 10-06	PU 10-06	10.2	6	1.7		
PS 10-12	PU 10-12	10.8	12	0.9		
PS 10-15	PU 10-15	10.5	15	0.7		
PS 10-18	PU 10-18	10.8	18	0.6		
PS 10-24	PU 10-24	12.0	24	0.5	none	Open frame, with barrier strip 97 x 90 x 32 (220g)
PS 15-05	PU 15-05	15.0	5	3.0		
PS 15-06	PU 15-06	15.0	6	2.5		
PS 15-12	PU 15-12	15.6	12	1.3		
PS 15-15	PU 15-15	15.0	15	1.0		
PS 15-18	PU 15-18	15.2	18	0.9	none	Open frame, with barrier strip 97 x 120 x 35 (330g)
PS 15-24	PU 15-24	16.8	24	0.7		
PS 30-05	PU 30-05	27.5	5	5.5	6.9	
PS 30-06	PU 30-06	28.2	6	4.7	8.0	
PS 30-12	PU 30-12	30.0	12	2.5	15.5	
PS 30-15	PU 30-15	30.0	15	2.0	20.0	Open frame, with barrier strip 97 x 155 x 38 (410g)
PS 30-18	PU 30-18	30.6	18	1.7	24.0	
PS 30-24	PU 30-24	31.2	24	1.3	31.0	
PS 50-05	PU 50-05	50.0	5	10.0	6.9	
PS 50-06	PU 50-06	50.4	6	8.4	8.0	
PS 50-12	PU 50-12	50.4	12	4.2	15.5	Open frame, with barrier strip 97 x 209 x 50 (880g)
PS 50-15	PU 50-15	51.0	15	3.4	20.0	
PS 50-18	PU 50-18	50.4	18	2.8	24.0	
PS 50-24	PU 50-24	50.4	24	2.1	31.0	
PS100-05		100.0	5	20.0	6.9	
PS100-06		99.6	6	16.6	8.0	Open frame, with barrier strip 97 x 209 x 50 (880g)
PS100-12		99.6	12	8.3	15.5	
PS100-15		99.0	15	6.6	20.0	
PS100-18		100.8	18	5.6	24.0	
PS100-24		100.8	24	4.2	31.0	

100W = PS Type only

## MK & MU Series (150W)

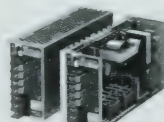
### Standard Single Output

**UL478 Approved (MK Type)**

### MK, MU SERIES



MK Series



MU Series

#### Features

- Small in Size—only 97(H) x 171(D) x 59(W)mm, or less than a liter in volume.
- Power type MOS-FET used at high frequency for high conversion efficiency, 80% typical.
- Immunity Characteristics: Lightning surge, 4kV; field strength, 50V/M

#### 特 長

- 小形97(H) x 171(D) x 59(W)mm—1リットル以下は業界屈指
- パワーMOS-FETを採用、電圧変化ははかり、電効率化(効率80% T<sub>yp</sub>)を表現
- イミュニティ/耐雷サージ: 4kV、耐強電界: 50V/M

**Input Voltage: MK 90~132V AC, 120~175V DC**  
**MU 180~264V AC, 240~350V DC**

Model		Rated Power (W)	Rated Voltage (V)	Rated Current (A)	Over-Voltage protection <(V)	Dimensions H x L x W (mm) Wt: F Type (g)
100V AC	200V AC					
MK150-05	MU150-05	150.0	5	30.0	6.9	97 x 171 x 59 (1,000g)
MK150-06	MU150-06	150.0	6	25.0	8.0	
MK150-12	MU150-12	150.0	12	12.5	15.5	
MK150-15	MU150-15	150.0	15	10.0	20.0	
MK150-18	MU150-18	151.2	18	8.4	24.0	
MK150-24	MU150-24	151.2	24	6.3	31.0	

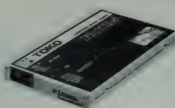
## FT7R5 &amp; FM7R5 Series (7.5W)

Standard Triple Output

UL1950 Approved (FT7R5 Type)

## Features

- Slender body: Thickness of half an inch (12.7mm) makes this power supply only half as thick as its predecessor.
- Compact: Volume of 0.1 liter is only 48% that of the previous model.
- Mounting versatility: Can be mounted vertically, horizontally, or on card.

W: 1/2 inch  
on card

## 特長

- 厚さ1/2インチ(12.7mm)の薄形電源
- 小形: 体積0.1ℓは、従来品の48% (当社比)
- 実装自由: タテ置き、ヨコ置き、オンカード実装可

## Specifications

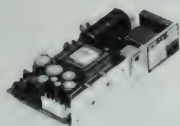
Input Voltage: FT7R5 85~132V AC FM7R5 170~264V AC

Output Power (W)	Model		Output Voltage (V) and Current (A)			Dimensions H x L x W (mm) Wt: F Type (g)
	100V AC	200V AC	CH1 (V1)	CH2 (V2)	CH3 (V3)	
7.5	FT7R5-01	FM7R5-01	+5V · 1A	+12V · 0.1A	-12V · 0.1A	70 × 120 × 12.7 (160g)
	FT7R5-11	FM7R5-11	+5V · 1A	+15V · 0.1A	-15V · 0.1A	
	FT7R5-21	FM7R5-21	+5V · 1A	+12V · 0.1A	-5V · 0.1A	

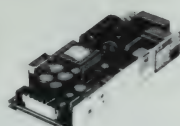
## MW Series (17.5, 31, 51, 100W) Standard Worldwide input, Thin multi output

UL1950 Approved

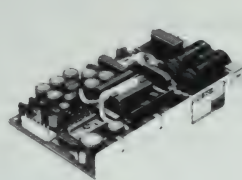
MW SERIES



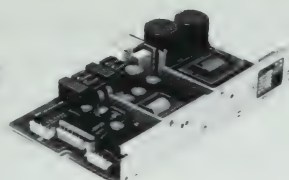
MW15



MW30



MW50



MW100

## Features

- Optimum flexibility output (Flex power method)
- Thin and compact (MW15, 30, 50, 25.4mm thick; MW100, 40mm thick)
- Designed to withstand voltage to 3,750V AC

## 特長

- フレキシビリティに富むマルチ出力方式 (フレックスパワー方式)
- 小形、薄形 (MW15, 30, 50は厚さ25.4mm、MW100は厚さ40mm)
- 耐圧 403.750V対応設計

## Specifications

Input Voltage (V)	Total Power (W)	Model	Output Voltage (V) and Current (A)				Dimensions (mm)		
			V1	V2	V3	V4	H	D	W
85~264V AC	17.5	MW15-01	+ 5V/3A	+12V/0.5A	-12V/0.5A	—	60	110	25.4
		MW15-11	+ 5V/3A	+15V/0.5A	-15V/0.5A	—			
	31	MW30-01	+ 5V/5A	+12V/1.2A	-12V/0.5A	—	60	150	25.4
		MW30-11	+ 5V/5A	+15V/1.2A	-15V/0.5A	—			
85~132V AC 170~264V AC	51	MW50-01	+ 5V/8A	+12V/1.5A	-12V/1A	—	95	155	25.4
		MW50-11	+ 5V/8A	+15V/1.5A	-15V/1A	—			
		MW50-21	+ 5V/8A	+12V/1.5A	- 5V/1A	—			
		MW100-01	+ 5V/12A	+24V/2A	+12V/2A	-12V/1A			
	100	MW100-02	+ 5V/12A	+12V/2A	+12V/2A	-12V/1A	120	210	40
		MW100-03	+ 5V/12A	+12V/2A	-12V/2A	—			
		MW100-04	+24V/3A	+12V/2A	+ 5V/2A	-12V/1A			

- Flex power system may be used up to the max. power per channel but not to exceed the total power.

- フレックスパワー方式: 出力電力は各チャンネルの最大電力範囲内で使用できますが、全定格出力を超えないこと

Example MW15-01 + 5V/3A (15W) +12V/0.5A (6W) -12V/0.5A (6W) Total output 17.5W  
Usage example: 1. +5V/2A (10W) +12V/0.3A (3.6W) -12V/0.2A (2.4W) Total output 16W  
2. +5V/1A (5W) +12V/0.5A (6W) -12V/0.5A (6W) Total output 17W

## LW Series (17.5, 31, 51, 100W) Standard Worldwide input, Thin multi output



LW SERIES

LW100

LW50

LW30

LW15

## Features

- 3 years Free Warranty
- More than 5 years Life (Full Load 40°C ambient temp)
- Low Profile
  - LW15, 30, 50: 25.4mm (1 inch)
  - LW100 : 40mm
- World Wide Input Voltage
  - LW15, 30, 50: 85 ~ 264V AC
  - LW100 : 85 ~ 132V AC/170 ~ 264V AC (Switchable)
- \* ● Flex Power method

## Safety Standards

- UL1950 Approved
- CSA EB1402C Approved
- NE60 940 (IEC950) Approved
- Japanese Safety STD Comply with

## EMI Regulations

- FCC Part 15 class A/B
- VDE0871 class A/B
- VCCI class I, II

## Specifications

Input Voltage (V)	Total Power (W)	Model	Output Voltage (V) and Current (A)				Dimensions (mm)		
			V1	V2	V3	V4	H	D	W
85 ~ 264V AC	17.5	LW15-01	+ 5V/3A	+ 12V/0.5A	- 12V/0.5A	—	70	128	25.4
		LW15-11	+ 5V/3A	+ 15V/0.5A	- 15V/0.5A	—			
	31	LW30-01	+ 5V/5A	+ 12V/1.2A	- 12V/0.5A	—	70	175	25.4
		LW30-11	+ 5V/5A	+ 15V/1.2A	- 15V/0.5A	—			
	51	LW50-01	+ 5V/8A	+ 12V/1.5A	- 12V/1A	—	110	190	25.4
		LW50-11	+ 5V/8A	+ 15V/1.5A	- 15V/1A	—			
85 ~ 132V AC 170 ~ 264V AC	100	LW100-01	+ 5V/12A	+ 24V/2A	+ 12V/2A	- 12V/1A	120	244	40
		LW100-02	+ 5V/12A	+ 12V/2A	+ 12V/2A	- 12V/1A			
		LW100-03	+ 5V/12A	+ 12V/2A	- 12V/2A	—			
		LW100-04	+ 24V/3A	+ 12V/2A	+ 5V/2A	- 12V/1A			

\* (● Flex power system may be used up to the max. power per channel but not to exceed the total power.

● フレックスパワー方式：出力電力は各チャンネルの最大電力範囲内で使用できますが全定格出力を超えないこと。

Example: LW15-01 + 5V/3A (15W) + 12V/0.5A (6W) - 12V/0.5A (6W) Total output 17.5W

Usage example: 1. + 5V/2A (10W) + 12V/0.3A (3.6W) - 12V/0.2A (2.4W) Total output 16W

2. + 5V/1A (5W) + 12V/0.5A (6W) - 12V/0.5A (6W) Total output 17W

## 特長

- 3年間無償保証
- 40°C全負荷で寿命5年以上
- 薄形設計
  - LW15, 30, 50: 25.4mm (1インチ)
  - LW100 : 40mm
- ワールド入力電圧
  - LW15, 30, 50: AC85 ~ 264V連続
  - LW100 : AC85 ~ 132V/AC170 ~ 264V切り替え

## \* ● フレックスパワー方式

## 安全規格

- UL1950 認定
- CSA EB1402C 認定
- EN60 950 (IEC950) 認定
- 電気用品取締法対応設計

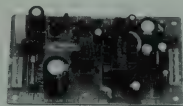
## EMI規格

- FCC Part 15 クラスA、B対応設計
- VDE 0871 クラスA、B対応設計
- VCCI クラスI、II対応設計

# ET and EM Series (10, 15W)

Triple Output, economical design and small space requirement

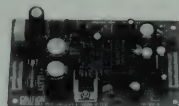
ET&EM SERIES



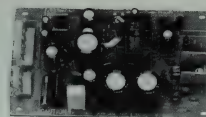
ET10



ET15



EM10



EM15

## Features

- Toko's original circuitry used for economy and ease in operation.
- Printed board and connectors used for minimizing size and weight.
- Low noise characteristics—conforms to FCC Class B regulations.

## 特長

- 独自回路方式により経済的効果と使い易さを追求した低ノイズ電源。
- 軽量、小形、プリント基板、コネクタ構造
- 低ノイズ(基板タイプでFCCクラスBをクリア)

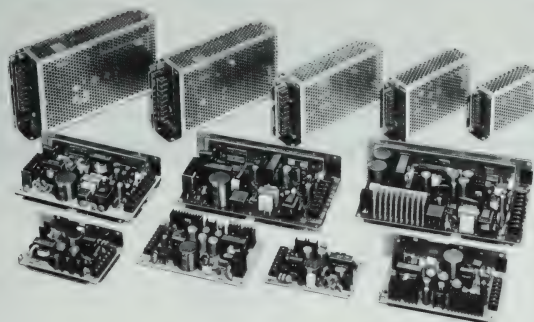
Specifications Input Voltage: ET 85 ~ 132V AC, EM 170 ~ 264V AC

Output Power (W)	Model		Output Voltage (V) and Current (A)			Dimensions H x D x W (mm) (Unit in grams)
	100V AC	200V AC	CH1 (V1)	CH2 (V2)	CH3 (V3)	
10	ET10-01	EM10-01	+5V · 1A	+12V · 0.3A	-12V · 0.1A	65 × 112 × 32 (100)
	ET10-11	EM10-11	+5V · 1A	+15V · 0.3A	-15V · 0.1A	
	ET10-21	EM10-21	+5V · 1A	+12V · 0.3A	-5V · 0.1A	
15	ET15-01	EM15-01	+5V · 2A	+12V · 0.3A	-12V · 0.2A	78 × 125 × 35 (120)
	ET15-11	EM15-11	+5V · 2A	+15V · 0.3A	-15V · 0.2A	
	ET15-21	EM15-21	+5V · 2A	+12V · 0.3A	-5V · 0.2A	

# PT Series (15, 30, 50, 75 100W) Standard Triple Output

UL478 Approved

PT SERIES



## Features

- Suitable models available for various applications.
- High performance design at low cost.
- Wide range in selection of structures.
- Wide input voltage range. 85 to 132V AC.
- Designed to meet safety regulations of CSA.
- Designed to meet noise regulations of FCC and CISPR.
- UL478 approved.
- Series operation is possible.

## 特長

- 多用途に適合する豊富な品揃え
- コストパフォーマンスに優れた設計
- 選択容易で自在な構造ハリエーション
- 広範囲な入力電圧
- 安全規格(電取、CSA)対応設計
- UL478認定品
- 雑音規格(FCC、CISPR)対応設計

## Specifications

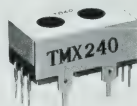
Input Voltage (V)	Output Power (W)	Model	Output Voltage (V) and Current (A)			Dimensions (mm)			Remarks
			V1	V2	V3	H	D	W	
85 ~ 132V AC	15	PT 15-01	+5V/2A	+12V/0.3A	-12V/0.2A	81	127.5	38	V2, V3 Practically regulated
		PT 15-02	+5V/2A	+12V/0.3A	-12V/0.2A				
		PT 15-11	+5V/2A	+15V/0.2A	-15V/0.2A				
	30	PT 15-21	+5V/2A	+12V/0.3A	-5V/0.2A	100	164.5	45	V2, V3 Practically regulated
		PT 30-01	+5V/3A	+12V/1A	-12V/0.3A				
		PT 30-02	+5V/3A	+12V/1A	-12V/0.3A				
		PT 30-11	+5V/3A	+15V/0.7A	-15V/0.3A				
		PT 30-21	+5V/3A	+12V/1A	-5V/0.3A				
	50	PT 50-01	+5V/5A	+12V/1A	-12V/1A	112.5	198	50	V2, V3 Practically regulated
		PT 50-02	+5V/5A	+12V/1A	-12V/1A				
		PT 50-03	+5V/6A	+12V/1.2A	-12V/0.3A				
	75	PT 75-01	+5V/10A	+12V/1A	-12V/1A	126.5	225	55	V2, V3 Practically regulated
		PT 75-02	+5V/10A	+12V/1A	-12V/1A				
		PT 75-03	+5V/12A	+12V/0.5A	-12V/0.5A				
		PT 75-04	+5V/9A	+12V/2A	-12V/0.5A				
		PT 75-11	+5V/9A	+15V/1A	-15V/1A				
	100	PT100-01	+5V/12A	+12V/3A	-12V/0.5A	142	248	55	V2, V3 Practically regulated
		PT100-02	+5V/12A	+12V/3A	-12V/0.5A				

## Hybrid IC・Module Applications ハイブリッドIC・モジュール 用途別一覧

Application Item Name		Audio Equip.		Video Equip.				Communi- cations Equip.		Industrial Equip.					
		Audio	Car Audio	Television Receivers	Video Cassettes Recorders (VTR)	Integrated Video Cameras	Electronic Still Cameras	Wire Telecommunication Equipment	Wireless Telecommunication Equipment	OA Equipment	Electronic Computers/Data Equipment	FDD/HDD	Printers	Displays	Electric Measurement Instruments
Modules	Telecommunication Modules							●	●						
	Active Filters	●	●					●	●						
	AM RF Modules		●												
	TOKEN RING LAN Interface Modules									●					
DC DC Converters	CPS 1000 Series	●	●		●			●	●	●			●	●	●
	CPS 5000 Series	●	●		●			●	●	●			●	●	●
	CPS 6000 Series	●	●		●			●	●	●			●	●	●
	FMK Series							●	●	●	●	●	●	●	●
	E Series							●	●	●	●	●	●	●	●

## Modules for Mobile Communications Equipment 携帯無線機用モジュール

## Variable Band Pass Filter for VHF



TMX240

## Features

- For hand held radio equipment
- RF band pass filter for VHF by electronic tuning
- The filter structure is 2 pole, I/O impedance 50Ω with image trap.
- Miniature size (2.7cc)

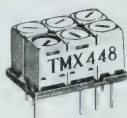
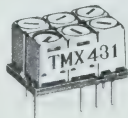
## 特長

- ハンディ無線用
- 電子同調方式のVHF帯RFバンドパスフィルタ
- イメージトラップ付2ポール、入出力インピーダンス50Ωのフィルタ構成
- 超小形2.7cc

## Specifications

Item	Characteristics
Tuning Frequency	150 ~ 174MHz
Tuning Voltage	0.5 ~ 4.5VDC
Input Impedance	50Ω
Output Impedance	50Ω
Operating Temperature Range	-30 ~ +60°C

## Front end module for radio communications equipment



VHF: TMX314, -316, -324  
UHF: TMX258, -302, -304, -305

## Specified Small Power Radio: TMX431, -448

## Features

- Each module is composed of RF input circuit, amplifier for oscillator, and a mixer circuit.
- Miniature size (3.3cc)

## 特長

- 受信部のRF回路、OSC部のAMP、MIXER回路をコンパクトに一括。
- 超小形 3.3cc

## Specifications

Item No.	Reception frequency MHz	Item No.	Reception frequency MHz
TMX324	132 ~ 150	TMX304	470 ~ 490
TMX314	150 ~ 162	TMX305	490 ~ 512
TMX316	162 ~ 174	TMX448	405 ~ 440
TMX302	400 ~ 420	TMX431	435 ~ 470
TMX258	450 ~ 470		

## Front end module for MCA (tranking) radio



THX460

## Features

- Each module is composed of RF input circuit, and amplifier for oscillator, and a mixer circuit.
- Miniature size (4.7cc)

## 特 長

- 受信部のRF回路、OSC部のAMP、MIXER回路
- 第1IFフィルタ部をコンパクトに一括。
- 超小形 4.7cc。

## Specifications

Item	Standard	Conditions
Tuning Frequency	851 ~ 870MHz	
RF Input Impedance	50Ω	
OSC Input Impedance	50Ω	
Intermediate Frequency	45.1MHz	
Sensitivity (12dB SINAD)	-12dBμ max.	1kHz ± 3kHz dev. fo ± 9.5MHz
Current Consumption	9mA max.	No signal

## IF amplifier module



TMX235

## Features

- Each module contains 1st IF amplifier, 2nd IF amplifier, detector circuit, and noise squelch.
- Low voltage, low current operation
- Miniature size (4.3cc)

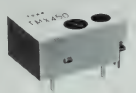
## 特 長

- 第1IF増幅、第2IF増幅、検波およびノイズスケルチを内蔵
- 低電圧・低電流動作が可能
- 超小形 4.3cc。

## Specifications

Item	Standard	Conditions
1st. IF	21.4MHz	
2nd. IF	455kHz	
Input Impedance	1.5kΩ	
AF Output Impedance	10kΩ	
Sensitivity (20dB SINAD)	0.5μV max.	1kHz ± 3kHz dev.
Current Consumption	9mA max.	No signal

## IF Amplifier Module

Cellular Telephone : TMX-365  
Specified Small Power Radio: TMX-450

## Features

- Each module contains 2nd mixer, 2nd IF amplifier
- Miniature size (3.0cc)

## 特 長

- 第2ミキサ、第2IF増幅回路を内蔵。
- 超小形 3.0cc。

## Specifications

Item	TMX365	TMX450	Conditions
Operating Voltage	4.0 ~ 9.5V (DC)	4.5 ~ 6.3 (DC)	
1st. IF	45MHz	45MHz	
2nd. IF	455kHz	455kHz	
Input Impedance	50Ω	560Ω	
Sensitivity (12dB SINAD)	-113dB max.		1kHz ± 8kHz dev.
		-111dBm max.	1kHz ± 1.5kHz dev.
Current Consumption	8.0mA max.	7.5mA max.	No signal

## IF Amplifier Module



TMX-322

## Features

- Each module contains 2nd IF amplifier, detector circuit, and noise squelch.
- Miniature size (5.4cc)

## 特 長

- 第1IF増幅、第2IF増幅、検波およびスケルチ機能を内蔵。
- 超小形 5.4cc。

## Specifications

Item	Standard	Conditions
Operating Voltage	4.0 ~ 9.5V (DC)	
1st. IF	45.1MHz	
2nd. IF	455kHz	
Sensitivity (12dB SINAD)	-11.5dB max.	Zin = 50Ω, 1kHz ± 3kHz dev.
Current Consumption	10mA max.	No signal

## TX Pre-Driver Module



THX-405

## Features

- Equipped with OSC and TX output
- Miniature size (1.3 cc)

## 特 長

- OSC出力、Tx出力を備える回路構成。
- 超小形 1.3cc。

## Specifications

Item	Standard
Frequency Range (OSC OUT)	806 ~ 825MHz
Frequency Range (Tx OUT)	806 ~ 870MHz
Operating Voltage Vcc1	4.0 ~ 7.5V
Operating Voltage Vcc2	0 ~ 5.2V
Operating Voltage Vcc3	6.7 ~ 7.5V
Input Impedance	50Ω
Output Impedance	50Ω

## PLL Frequency Synthesizer Module



VHF: TMX-268

UHF: TMX-249

## Features

- For hand held radio equipment
- The circuit structure includes a frequency synthesizer and a dual modulus prescaler
- Miniature size (3.1 cc)

## 特 長

- ハンディ無線用
- 周波数シンセサイザとデュアルモジュラスプリスケラを内蔵の回路構成。
- 超小形 3.1cc。

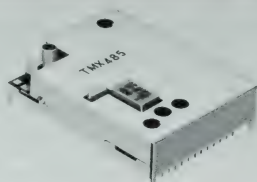
## Specifications

TMX268 (VHF)	Transmission (400 ch)	Reception (400 ch)
Low Band	136 ~ 148MHz	157.4 ~ 159.4MHz
Medium Band	150 ~ 162MHz	171.4 ~ 183.4MHz
High Band	162 ~ 174MHz	183.4 ~ 195.4MHz

TMX249 (UHF)	Transmission (800 ch)	Reception (800 ch)
Low Band	400 ~ 420MHz	421.4 ~ 441.4MHz
Medium Band 1	450 ~ 470MHz	471.4 ~ 491.4MHz
Medium Band 2	470 ~ 490MHz	491.4 ~ 511.4MHz
High Band	490 ~ 510MHz	511.4 ~ 531.4MHz

## Transceiver Unit 小電力コードレスホン用RFモジュール



HAND: TMX485

BASE: TMX486

## 特 長

- 小形(23cc)、軽量(27g)
- 低電圧動作(ニッカド電池3本対応)
- 低消費電流(HAND待受時50mA以下)

## Features

- Miniature size (23cc).
- Low voltage operation (HAND SET).
- Low power consumption (HAND SET).
- Superior Adjacent channel rejection.

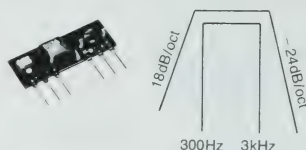
## Specification

Item	TMX485 (HAND)	TMX486 (BASE)	Unit
TX Frequency Range	253.8625 ~ 254.9625	380.2125 ~ 381.3135	MHz
RX Frequency Range	380.2125 ~ 381.3125	253.8625 ~ 254.9625	MHz
Channel (at 12.5kHz)	89	89	CH
Supply Voltage	3.3 ~ 4.5	4.5 ~ 5.5	V
RX Current Consumption	50 Max.	65 Max.	mA
TX/RX Current Consumption	80 Max.	110 Max.	mA
Frequency Stability	3.8 Max.	3.8 Max.	PPM
TX Output Power	10	10	mW
TX Spurious Level	-46 Max	-46 Max	dBm
Carrier Sense Level	2 Max.	2 Max.	μV
ANT Leakage	-54 Max.	-54 Max.	dBm
Operating Temperature Range	0 ~ 50	0 ~ 50	°C
ANT Impedance	50	50	Ω

## Active Filters for Cellular Telephones セルラーテレホン用アクティブフィルタ

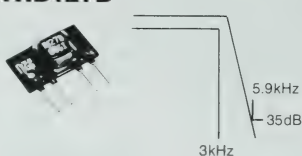
## Bandpass Filters

## THB112A



## Lowpass Filters

## THB127B



## Combination Filter

## THB227



## Features

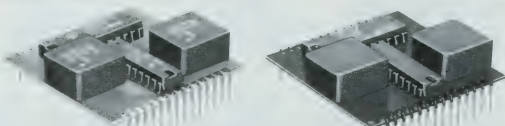
- Small size with low profile in SIP configuration.
- Operation with a single power source over a wide range of voltage.
- Low current consumption permits use in hand-held units.
- Use of the hybrid structure results in superior temperature characteristics.

## 特 長

- 小形、低背のSIP形
- 単電源で動作電源、電圧範囲を広く使用可能
- 低消費電流でハンディタイプに最適
- ハイブリッド構造による優れた温度特性。

## Interface Module for TOKEN RING LAN トークンリングLAN用インタフェースモジュール

Includes Texas Instruments Chip Sets



THF 179

## Description

The THF179 is a hybrid module developed for the interface of the TOKEN RING LAN. It is for use in the transmit-receive operation of data in accordance with IEEE STD. 802.5 (1985).

## 概 要

THF179はトークンリングLANのインタフェース用として開発したハイブリッドモジュール。IEEE802.5(1985)の標準に準拠したデータの送受信が可能

## Specifications (Absolute Maximum Ratings)

Item	Symbol	Rating
Operating Temperature	Ta	0 ~ +55°C
Storage Temperature	Tstg	-55 ~ +125°C
Input Voltage	Vin	-0.5 ~ +7V
Output Voltage	Vout	-0.5 ~ +7V
Supply Voltage	Vcc	-0.5 ~ +7V
Power Consumption	Pd	1.6W

DC-DC Converter Modules DC-DCコンバータ モジュール

CPS Series



Features

A ceramic substrate is used to realize high output power and small overall size, all of which are important factors for space-saving in equipment.

特 長

- けい光表示管のフィラメント電圧用
- バイアス電圧供給用
- 小形機器の電圧供給用

CPS1000 CPS5000 CPS6000

Electrical Characteristics

Item Symbol Series	Output Power	Output Voltage		Output Current		Output Current Range		Output Voltage Tolerance		Input Voltage	Input Voltage Range	Conversion Efficiency	Operating Temp Range	Store Temp Range
	P <sub>o</sub>	V <sub>o1</sub> V <sub>o2</sub>	V <sub>o3</sub>	I <sub>o1</sub> I <sub>o2</sub>	I <sub>o3</sub>	I <sub>o</sub> DC Max./Min.	I <sub>o</sub> AC Max./Min.	αDC	αDC	V <sub>IN</sub>	V <sub>IN</sub> Max./Min.	η	T <sub>op</sub>	T <sub>stg</sub>
1000 1000-L 5000-L 5000-M series	1.2W Max.	-5 ~ -40V or +5 ~ +40V	AC1 ~ 10Vrms	80mA Max.	120mA Max.	40 ~ 100%	60 ~ 100%	±10%	±25%	+1.7 ~30V	V <sub>IN</sub> typ ±30%	≒55%	-20 ~ +65°C	-40 ~ +85°C
5000 series	2.4W Max.	-5 ~ -40V or +5 ~ +40V	AC1 ~ 10Vrms	80mA Max.	120mA Max.	40 ~ 100%	60 ~ 100%	±10%	±25%	+1.7 ~30V	V <sub>IN</sub> typ ±30%	≒55%	-20 ~ +65°C	-40 ~ +85°C
6000 series	6.0W Max.	-5 ~ -40V or +5 ~ +40V	AC3 ~ 10Vrms	400mA Max.	500mA Max.	40 ~ 100%	60 ~ 100%	±10%	±30%	+4.5 ~30V	V <sub>IN</sub> typ ±30%	≒70%	-20 ~ +85°C	-40 ~ +85°C

NOTE: V<sub>o1</sub>: V<sub>IN</sub> Max. + |V<sub>o1</sub> Max.| ≤ 45V, V<sub>o2</sub>: K·V<sub>IN</sub> Max. + |V<sub>o2</sub> Max.| ≤ 45V (K = Transformer winding ratio).

FMK Series (Non-floating Type)



Features

Optimum regulation (line/load). Highly reliable epoxy moulding.  
Power: F: 0.25, M: 0.5, K: 1.0W

特 長

- 独自の回路方式と独自の生産技術
- 高品質、高信頼性の産業用

E Series (Floating Type)



Features

Complete primary and secondary floating. Built-in filters, reduced ripple and spike noise.  
Power: 1.5W

特 長

- 入力側と出力側を完全にフローティング、絶縁
- 入出力側にフィルタを内蔵
- リップル、スパイクノイズが低い

Electrical Characteristics

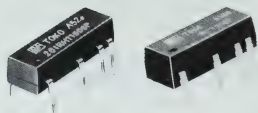
Item Type	Input Voltage	Output Power	Output Voltage	Initial Setting	Line Regulation	Load Regulation	Temperature Coefficient
FMK	+5V ±10%	0.25W 0.5W 1W	1-Channel Plus Voltage: +6V, +9V, +12V, +15V, etc 1-Channel Minus Voltage: -5V, -9V, -12V, -15V, etc 2-Channel Plus Minus Voltage: ±12V, ±15V, etc.	1-Channel: ±4% 2-Channel: ±5%	±0.4 ~ ±1.8%	0.6 ~ 5.0%	±0.1 ~ ±0.15%/°C
E	5V ±10% 12V ±10% 24V ±10%	1.5W	5V, 12V, 15V, 24V, ±12V, ±15V	1-Channel: ±5% 2-Channel: ±6%	±1% ~ ±1.5%	±4% ~ ±8%	0.1%/°C

## Delay Line and Pulse Transformer Applications ディレイライン・パルストランス 用途別一覧

Application			Printer	FDD	HDD	Optical File Disk	Controller Computer	Personal Computer	Office Computer	General Purpose Computer	Facsimile	Word Processor	POS	Electronic Switch Board	Medical Instruments	I.C. Tester Measurement Instruments	Robot · NC machinery	Wireless Transmission Devices (including satellites)	LAN
Description	Package	Series																	
Buffered Type Delay Lines (Active)	DIP	RHT		●	●	●	●	●						●	●	●	●		
		RZT		●	●	●	●	●		●	●	●	●	●	●	●	●		
	SIP	J <sub>10</sub> ET		●	●	●	●	●		●	●	●	●	●	●	●	●		
	SMD	RMT		●	●	●	●	●		●	●	●	●	●	●	●	●		
Passive Delay Lines	DIP	R <sub>20</sub> ET	●	●		●	●	●		●	●	●	●	●	●	●	●	●	●
		RET	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●
		JAT		●	●	●	●	●		●	●	●	●	●	●	●	●	●	●
		RQT		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	SIP	J <sub>10</sub> D(T)			●	●	●	●	●	●	●	●			●				
		JF(T)			●			●	●										
		RST		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
Pico Second Delay Lines	DIP	PICO DELAY	●				●									●		●	
	SIP	S <sub>3</sub> P	●				●									●		●	
		SS	●				●									●		●	
Pulse Transformers		Q <sub>10</sub> R / Q <sub>20</sub> R		●	●					●	●	●			●			●	●
		Q <sub>30</sub> A				●							●					●	●
		P <sub>17</sub> H		●	●	●					●	●	●	●		●		●	●

## Delay Lines ディレイライン

## RHT・RZT Type



## Features

- TTL (74S04) Included.
- Total Delay: 20 ~ 250ns.
- DIP 5 outputs.
- Accurate control of leading and trailing edges. (RHT)

## 特 長

- TTL (74S04相当)内蔵のバッファードディレイライン
- 全遅延時間20 ~ 250ns.
- DIP 5出力
- リーディングエッジ及びトレーリングエッジを高精度管理(RHT)

J<sub>10</sub>ET Type

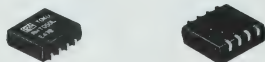
## Features

- TTL (74S04) Included.
- Total Delay: 20 ~ 250ns.
- SIP 5 outputs.

## 特 長

- TTL (74S04相当)内蔵のバッファードディレイライン
- 全遅延時間20 ~ 250ns.
- SIP 5出力

## RMT Type



## Features

- TTL (74S04) Included.
- Total Delay: 20 ~ 200ns.
- SMD 5 outputs.

## 特 長

- TTL (74S04相当)内蔵のバッファードディレイライン
- 全遅延時間20 ~ 200ns.
- 面実装形 5出力

R<sub>20</sub>ET Type

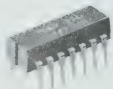
## Features

- Total Delay: 2 ~ 300ns.
- 16-pin DIP 10 outputs.
- Exceptional Frequency Characteristics.

## 特 長

- 全遅延時間2 ~ 300ns.
- DIP16ピン10出力
- 優れた周波特性

## RET Type



## Features

- Total Delay: 2 ~ 300ns.
- 14-pin DIP 10 outputs.
- Exceptional Pin-connection characteristics.

## 特 長

- 全遅延時間2 ~ 300ns.
- DIP14ピン10出力
- 各種カスタム結線が可能

## RST Type



### Features

- Total Delay: 10~200ns.
- SMD 5 outputs.
- Low profile (4mm Max.).

### 特長

- 全遅延時間10~200ns.
- 実装形5出力
- 低背形 (4mm Max.)

## RQT Type



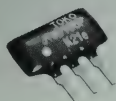
### Features

- Total Delay: 10~300ns.
- 8-pin DIP 5 outputs.
- Low profile.

### 特長

- 全遅延時間10~300ns.
- DIP 8ピン5出力
- 低背形

## J<sub>10</sub>D/JF Type



### Features

- Total Delay: 10~150ns. (JD)  
50~400ns. (JF)
- Small size with fixed SIP configuration.

### 特長

- 全遅延時間 10~150ns.(JD)  
50~400ns.(JF)
- 小形SIP固定形 (中間タップ付きも可能)
- ハイインピーダンス対応可能 (JF)

## S<sub>3</sub>P Type



### Features

- Total Delay: 100ps~2.5ns. (100ps Step).
- Thin with fixed SIP configuration.

### 特長

- 全遅延時間100ps~2.5ns. (100psステップ)
- 薄形SIP固定形
- 優れた周波数特性
- 高精度、高信頼性

## SS Type



### Features

- Total Delay: 1~5ns. (1ns. Step).
- Small thin size with fixed SIP configuration.

### 特長

- 全遅延時間 1~5ns. (1ns.ステップ)
- 小形・薄形SIP固定形

## Pulse Transformers パルストランス

### Q<sub>10</sub>R/Q<sub>20</sub>R Type



### Features

- For Token-Ring LAN Equipment.
- Four windings are available for use.
- SMD Available (Q<sub>20</sub>R)

### 特長

- トークンリングLANの送受信回路に最適
- 4次巻線まで対応可能
- 面実装対応可 (Q<sub>20</sub>R)

### Q<sub>30</sub>A Type



### Features

- Features up to 4 circuits.

### 特長

- DIP16ピンパッケージに最大4個のバルストランスを内蔵

### P<sub>17</sub>H Type



### Features

- Wide bandwidth characteristics.
- Transfer-molded for high reliability.

### 特長

- 広帯域特性
- トランスファーモールドによる高信頼性

## Pulse Modules パルスモジュール

### PM02 Type



### Features

- IEEE 802.3 10BASE T based.
- Common Mode Choke included.
- Terminate Resistors for various Transistor IC available.
- Small, high reliability.

### 特長

- IEEE802.3 10BASE T 準拠
- コモンモードチョーク搭載
- 各種トランシーバICに適合した抵抗が内蔵可能。
- 小形、高信頼性



Manufactured by SPT (U.S.A.), member of TOKO Group SPT IC 商品

Part Number		Description	Application
A/D Converter	HADC574Z	12-BIT A/D CONVERTER TTL, S/H, 25 $\mu$ s Conversion Speed	For use in following systems and equipment
	HADC674Z	12-BIT A/D CONVERTER TTL, S/H, 15 $\mu$ s Conversion Speed	
	SPT774	12-BIT A/D CONVERTER TTL, S/H, 8 $\mu$ s Conversion Speed	
	SPT7572	12-BIT A/D CONVERTER TTL, S/H, 5 $\mu$ s Conversion Speed	
	HADC77100	FLASH A/D CONVERTER 150MHz Sample Rate, 50MHz Bandwidth	
	HADC77200	FLASH A/D CONVERTER 150MHz Sample Rate, 75MHz Bandwidth	
	SPT7810	10-BIT A/D CONVERTER ECL, T/H, 20MHz Sample Rate	
	SPT7814	10-BIT A/D CONVERTER ECL, T/H, 40MHz Sample Rate	
D/A Converter	HDAC7541Z	BI-CMOS, 12-BIT MULTIPLYING D/A CONVERTER	Factory Automation Data Processing Communications Security Measurements and Testing Medical Instrumentation
	HDAC7542A	BI-CMOS, 12-BIT BUFFERED D/A CONVERTER	
	HDAC7543A	BI-CMOS, 12-BIT SERIAL INPUT D/A CONVERTER	
	HDAC7545A	BI-CMOS, 12-BIT BUFFERED D/A CONVERTER	
	HDAC10180	8-BIT, HIGH-SPEED D/A CONVERTER ECL 275MHz	
	HDAC10181	8-BIT, HIGH-SPEED D/A CONVERTER ECL 275MHz with Reference	
	HDAC51400	8-BIT, ULTRA HIGH-SPEED D/A CONVERTER ECL 400MHz	
	HDAC52160	16-BIT, ULTRA HIGH-SPEED D/A CONVERTER Voltage Out 150ns	
Comparator	HCMP96850	SINGLE, HIGH-SPEED VOLTAGE COMPARATOR Differential Out	
	HCMP96870	DUAL, HIGH-SPEED VOLTAGE COMPARATOR Differential Out	
	SPT9689	DUAL, SUBNANOSECOND VOLTAGE COMPARATOR .65ns	
HSCF24040		PROGRAMABLE LOW-PASS FILTER	
Evaluation Board	EB100A	HADC77100AIJ	
	EB100B	HADC77100BIJ	
	EB101A	HADC77200AIJ	
	EB101B	HADC77200BIJ	
	EB102B	BUFFER BOARD	
	EB103	HADC77200 PING-PONG BOARD	
	EB104	HADC574Z/674Z	
	EB105	HSCF24040	
	EB7810	SPT7810/7814	

## System Product Applications システム商品 用途別一覧

## Control Products 制御商品 (OEMも承ります。)

Type	Application	Numerical Control	
		Machine Tools Robots Welding and Fusing Equipment Drawing Instruments Wood-working Tools Various Other Tools and Equipment for Special Purposes	Numerical Control Accessories
NCB-102-2B/3B (Numerical Control Board)		●	
NCB203-1, 4 (Numerical Control Board)		●	
NCB-204-1, 2, 6 (Numerical Control Board)		●	
NCB-205-2, 6, 10 (Numerical Control Board)		●	
NCB30 Series (Numerical Control Board)		●	
SCB30 (Servo Control Board)			●

## Video System Products 画像システム商品 (OEMも承ります。)

Type	Application	Still Image Processing	Moving Image Processing	Color Video Monitoring	Video Accessories
VT-300E/VT-500E (Image Processing Terminal)		●			
VT-300M (Moving Image Processing Terminal)			●		
MP-3000/MP-5000/MP-7000 (Moving Image Processing Terminal)			●		
TPM2000 (Color Video Inspection System)				●	
HDF-2000 (HDTV Frame Buffer Board)		●			
VIF-1000 (Digital VTR (D-1) Buffer)			●		
HM-7000, HDA-5000, TEN-6010N					●

## Numerical Control Boards 数値制御用ボード

## Description

In recent years, the automation and rationalization in factories has become a necessity. To aid the process, Toko has developed the NCB Series of numerical control boards for easier control of motors. Toko's NC boards consist of NC LSIs (KM3701AD, KM3702AD) as well as multi-functional software and microprocessors which control positioning, straight line and arc interpolation, etc. of machinery. When interfaced with a micro or personal computer, these board output motor control signals according to prescribed commands. Output signals are in pulse or analog voltage to control pulse motors and AC or DC servo motors. Different from most ready made NC devices, these boards can be adapted to fit your specific controller needs.

## Applications

- Manufacturing equipment.
- Assembly robots.
- Processing robots.
- Arc welding and cutting equipment.
- Drafting equipment.
- Woodworking machinery.
- Adhesive application equipment.
- Painting machines
- Engraving machines
- Winding machines
- Specialized machinery.

## 概要

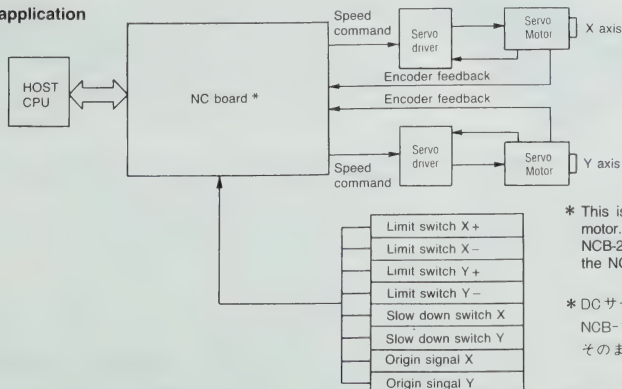
近年、生産工場における自動化、省力化は必要不可欠なものとなっています。東光“NCBシリーズ”はこの様な背景の中で各種モータをより容易に制御する目的で開発しました。

数値制御用LSI (KM3701AD, KM3702AD)、多機能なソフトウェアおよびマイクロプロセッサなどを搭載、位置決め、直線補間、円弧補間などの機能を有しています。外部のマイクロコンピュータ、パソコンなどと接続し所定のコマンドを転送すると、モータ制御用信号を出力します。出力信号形式はパルス列およびアナログ電圧で、パルスモータ、ACおよびDCサーボモータに対応できます。即製のNC装置とは違って使用目的にフィットしたコントローラの構築が可能です。

## 用途

- 工作機械
- 組立ロボット
- 加工ロボット
- 溶接、溶断機械
- 製図機
- 木工機械
- 接着剤塗布機
- 塗装機械
- 彫刻機械
- 巻線機械
- 各種専用機械

## Example of application



\* This is an example when controlling a servo motor. For this purpose, the NCB-102, NCB-203, NCB-204 and NCB-205 can be used as such but the NCB30 must have an SCB30 attached.

\* DCサーボモータをコントロールする例です。  
NCB-102, NCB-203, NCB-204およびNCB-205はそのまま、NCB30はSCB30を付加し、ご使用下さい。

## Numerical Control Boards 数値制御ボード

## NCB30 Series



NCB30X

NCB30V

NCB30P

NCB30N

## Description

The NCB30 Series consists of highly efficient NC boards developed for simultaneous positioning control and interpolation control of two axes.

The NCB30 Series consists of four types of boards to match different bus constructions. For personal computers, there are the NCB30N for the NEC PC9801, the NCB30P for the IBM PC/AT and the NCB30X for the IBM PC/XT. For the VME bus I/O channel, there is the NCB30V.

The NCB30 Series of boards output pulses which are used as position/speed control signals. By using the optional SCB30 (Servo control board), analog voltage speed control signals can be output.

## Features

- Basic functions : Positioning, linear and circular interpolation, origin return, step feed, jog feed.  
No. of control axes : Two simultaneously.  
Feed speed : Positioning: 400KPPS, linear interpolation: 400KPPS circular interpolation: 200KPPS.  
Max. command value:  $\pm 2^{31}$  ( $\pm 2, 147, 483, 647$  pulses).

## Type

Please use the designations listed below when placing your order.

Type	Function
NCB30N	For the PC9800 Series
NCB30V	For the VME I/O bus
NCB30P	For the IBM PC/AT
NCB30X	For the IBM PC/XT

## 概要

NCB30シリーズは、同時2軸の位置決めおよび補間制御を行うことを目的として開発した高性能のNCボードです。接続するバス構造の違いによる4種類のボードが用意されており、位置・速度指令信号としてパルス列を出力します。オプションのSCB30(サーボコントロールボード)を付加することにより、アナログ電圧の速度指令を出力することができます。

## 特長

基本機能: 位置決め、直線補間、円弧補間、原点復帰、ステップ送り、ジョグ送り

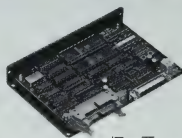
制御軸数: 同時2軸

送り速度: 位置決め400KPPS、直線補間400KPPS、円弧補間200KPPS

最大指令値:  $\pm 2^{31}$  ( $\pm 2, 147, 483, 647$ パルス)

## Servo Motor Control Board サーボモータコントロールボード

## SCB30



## Description

The SCB30 is a servo control board for two axes, which contains TOKO's KM3702D for positioning control and 12 bit D/A converters.

## Features

- No. of axes: Two
- D/A Converter: 12-bit resolution
- Output Voltage:  $-10$  to  $+10$ V; gain, adjustable ( $\times 0.2$  to  $\times 4.5$ )
- Input Pulse Train Rate: 500Kpps Max.
- Encoder Input Rate: 500Kpps (With  $\times 4$  selection)

## 概要

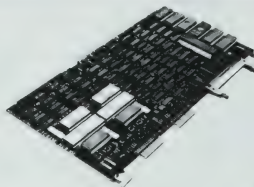
SCB30は、パルス列入力信号を電圧出力信号に変換する2軸のサーボコントロールボードです。位置制御LSI KM3702ADと12ビットD/Aコンバータなどを搭載しています。

## 特長

- 軸数: 2軸
- D/Aコンバータ: 分解能12ビット
- 出力電圧:  $-10$ V  $\sim$   $+10$ V、 $0.2 \sim 4.5$ 倍の範囲でゲイン調整可能
- パルス列入力レート: 500Kpps最大
- エンコーダ入力: 500Kpps最大(4倍倍時)(アソレーション付)

## Numerical Control Boards 数値制御ボード

## NCB-102-2B/3B



## Description

The NCB-102 is a numerical control board consisting of a microprocessor and high performance software.

Use is made of LSIs for function generation and positioning controls. The board generates signals for control of the servo position setting, interpolation of linear as well as the arc function, and for the stepping motor.

## Features

- Host CPU interface : Multi-bus  
Data send configuration : ASCII code  
Simultaneous control axes : For positioning and straight line  $-4$  for arc  $-2$   
Control output signal : Pulse and analog voltage

## Type

Type	Name	Explanation
NCB-102-2B	2 axes control board	Interfaces with host CPU
NCB-102-3B	Expansion board	With 2B+3B, control is increased to 4 axes

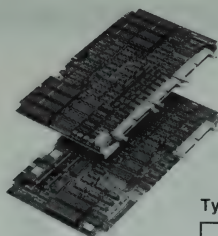
## 概要

NCB-102は、関数発生用LSIと位置制御用LSIを使用し、マイクロプロセッサと多機能なソフトウェアを搭載したインテリジェントなNCボードです。このボードはマルチバスを通して外部のホストCPUより転送される所定のコマンドにより、位置決め、直線・円弧補間を行いDCサーボおよびステッピングモータに移動出力します。

## 特長

- ホストCPUインタフェース: マルチバス  
転送データ形式: ASCIIコード  
同時制御軸: 位置決め、直線補間 4軸 円弧補間 2軸  
制御出力信号: パルス列およびアナログ電圧

## NCB203-1/4



Upper: 4-axis control boards  
(NCB203-4)  
Lower: Master board  
(NCB203-1)

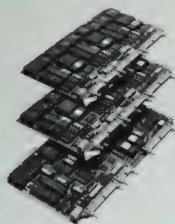
## Description

Positioning, linear or circular interpolation are possible by the specific commands transmitted by the host CPU through the IEEE796 bus. A maximum of eight axes can be controlled with a combination of the master board and two 4-axis control boards.

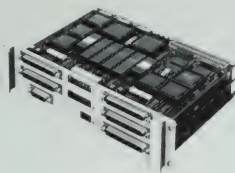
## Features

Host CPU interface : Multi-bus  
Data send configuration : Binary code (4 bytes, dual port memory)  
Simultaneous control axes: For positioning, straight line interpolation 2 axes  
Command gap : 11 $\mu$ s (TYP.)  
Control output signal : Pulse and analog voltage

## NCB-204/NCB-205



NCB-204



NCB-205

## Description

The NCB-204/205 are intelligent NC boards with microprocessor(s) and multi-function software installed. You can use the NCB-204/205 for positioning, liner interpolation and circular interpolation by sending commands from an external host CPU. Also, the 204/205 will output move command signals on the AC/DC serve motor and stepping motor by command from an external host CPU.

The NCB-204 supports the Multibus (IEEE-796 bus), and is capable of 2-axis liner/circular interpolation and independent positioning with up to 14 axes. The NCB-205, on the other hand, can be operated with the VME bus and has the functionality of 2-axis liner/circular interpolation and independent positioning with up to 10 axes.

## Features

Independent control: In the basic 2-axis mode, 204/205 can perform simultaneous interpolation control and independent control. With 3 axes and more, only independent control is possible.

Multiaxis: The 204 can support up to 14 axes while the 205 is capable of using at most 10 axes.

High speed: For positioning, 400 kpps. For liner interpolation, 400 kpps. For circular interpolation, 200 kpps.

Wide moving range: When operating independently, up to  $\pm 2^{31}$  ( $\pm 2,147,483,647$ ) pulses are applicable as the maximum move command value.

## Type

Type	Name	Explanation
NCB203-1	Master board	Interfaces with host CPU
NCB203-4	4 axes control board	Combined with master board, control is increased to 8 axes

## 概要

NCB203 はマルチバスを通して、外部のホストCPUから所定のコマンドを転送することにより、位置決め、直線・円弧補間を行い、AGサーボ、DCサーボ及びステッピングモータに移動指令信号を出力します。マスターボード及び2枚の4軸制御ボードの組合せにより、最大8軸までの制御が可能です。

## 特長

ホストCPUインタフェース マルチバス  
転送データ形式 バイナリコード(4バイトデュアルポートメモリを介す)  
同時制御軸 位置決め、直線補間 8軸 円弧補間 2軸  
コマンド間ギャップ 110 $\mu$ s(Typical)  
制御出力信号 バルス列およびアナログ電圧

## ■ NCB-204

Product Name	Description
NCB-204-1	Master board (2 axes)
NCB-204-2	Slave board (2 axes)
NCB-204-6	Slave board (6 axes)

## ■ NCB-205

Product Name	Description
NCB-205-2	2-axis unit (1 piece)
NCB-205-6	6-axis unit (2 piece)
NCB-205-10	10-axis unit (3 pieces)

## 概要

NCB-204 205は、マイクロプロセッサと多機能なソフトウェアを搭載したインテリジェントなNCボードです。外部のホストCPUから所定のコマンドを転送することにより、位置決め、直線・円弧補間を行い、AC DCサーボモータおよびステッピングモータに移動指令信号を出力します。

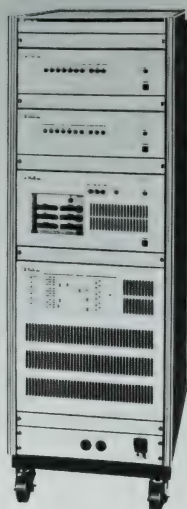
NCB-204はMultibus (IEEE-796 bus) に対応しており、2軸の直線・円弧補間、最大14軸の独立位置決め動作が可能です。また、NCB-205はVME busに対応しており、2軸の直線・円弧補間、最大10軸の独立位置決め動作が可能です。

## 特長

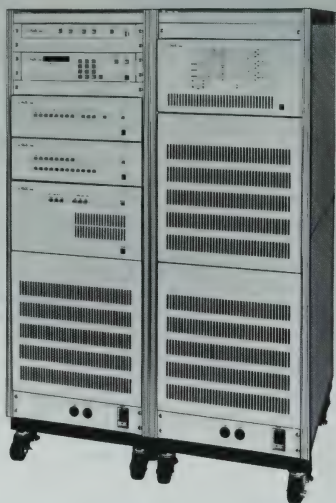
- 独立制御が可能…基本2軸は同時補間制御のみならず独立制御も可能、3軸以降は独立制御のみ可能
- 多軸対応………NCB-204で最大14軸、NCB-205で最大10軸の制御が可能
- 高速性………位置決め400kpps、直線補間400kpps、円弧補間200kpps
- 広い移動範囲………最大移動指令値として独立運転時 $\pm 2^{31}$ ( $\pm 2,147,483,647$ )パルスまで可能

## Moving Image Processing Terminal 動画像入出力装置

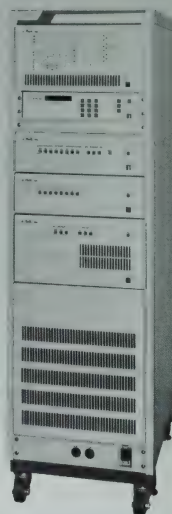
## MP-3000/MP-5000/MP-7000



MP-3000



MP-5000



MP-7000

## Description

The MP-series have been developed as a tool for improving the efficiency of computer simulation used in research for processing and understanding moving images and high efficiency image coding.

These system can be connected to various computers for the moving image simulation.

User friendly operating program (CLI=Command Language Interpreter), developed for moving image simulation, is available for remote control and image data transfer.

## 概要

各種テレビジョン信号の処理・理解及び高能率符号化などの研究を効率よく進めるためのツールとして開発した動画像入出力装置で、各種コンピュータと接続し、動画像処理シミュレータが構成できます。

動画像処理シミュレータ用に開発した操作プログラム (CLI=COMMAND LANGUAGE INTERPRETER) を使用、コンピュータのターミナルを用いて会話形式にて柔軟に本装置のコントロール及び各種コマンドの実行ができます。操作プログラムは国際電信電話株のご指導により開発しました。

## Applications

Research for

- Digital Image Communication
- Digital VTR
- Digital TV
- Intelligent Robot
- 3-D Moving Image Processing
- Computer Animation
- Television System
- Signal Generator

## 応用

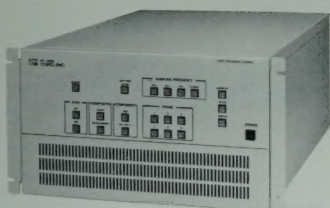
- 画像通信の研究
- デジタルVTRの研究
- デジタルTVの研究
- 視覚ロボットの研究
- 3次元動画像処理の研究
- コンピュータ・アニメーション
- テレビジョン方式の研究
- 動画像信号発生器

## Specifications

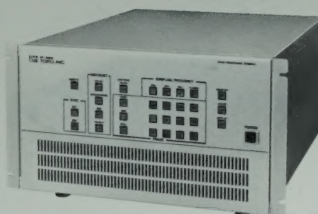
	MP-3000	MP-5000	MP-7000
IN/OUT Video Signal	NTSC 525/frame PAL, EDTV (option)	1125/60 (BTA S-001 Studio Spec.)	NTSC to HDTV
External Sync	Option	Tri-level bipolar Sync, or HD VD	C. Sync, HD VD, Tri-level bipolar Sync.
Sampling Frequency	14.32MHz (4 fsc) 2 fsc ~ 4 fsc (option)	74.25MHz, 64.8MHz, 48.6MHz (Switchable)	80MHz (Max.)
Quantization	8 bits/pixel	8 bit per pixel	8 bit per pixel
Video Memory	192MB (12 seconds of moving image)	384MB (2.1 seconds of moving image)	384MB
Video Memory Expansion	1.92GB (NTSC signal 120 seconds of moving image)	1.92GB (10.5 seconds of moving image)	1.92GB
Operating Program (CLI)	System control functions and various command execution routines	System control functions and various command execution routine	System control functions and various command execution routine
Computer	VAX, SUN, Apollo, HP or Convex	VAX, SUN, Apollo, HP or Convex	VAX, SUN, Apollo, HP or Convex
Power Source	AC 100V, 4kVA	100V, 5kVA	100V, 5kVA
Dimension	540(W) × 1607(H) × 750(D)mm	540(W) × 1607(H) × 750(D)mm × 2	540(W) × 1800(H) × 750(D)mm

## Image Processing Terminal 画像処理ターミナル

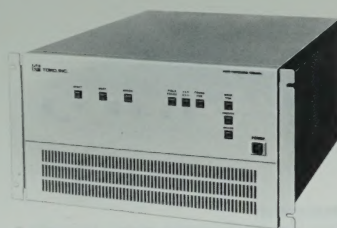
## VT-300E/VT-300M/VT-500E



VT-300E



VT-300M



VT-500E

## Description

These are image processing terminals for the picture storage of NTSC and Hi-Vision signal respectively.

The VT-300M is applicable to moving image. Image data transfer between the host CPU and VT-300M is possible via the parallel interface (GP-IB, Standard). This makes the a very useful tool in image filing, computer graphics, broadcast and other applications.

## Applications

- Image Processing. ● Computer Graphics. ● Frame Buffer.
- Standard Image Filing. ● Still Image Processing. ● Signal Generator.

## 概要

各種テレビジョン信号の静止画像シミュレーションに使用できる画像入出力装置です。

VT-300E/VT-500Eは静止画像、VT-300Mは動画像の取扱いが可能です。

各種テレビジョン信号を、デジタル画像データとして記憶し、ホストコンピュータに転送します。

ホストコンピュータにより、加工処理された画像データをモニタテレビに出し、アルゴリズムの評価を行うことができます。

VT-500EはNHK放送技術研究所のご指導により開発しました。

## 応用

- 画像処理 ● コンピュータ・グラフィックス ● 画像バッファ
- 標準画像ファイル ● 静止画像シミュレーション ● 信号発生器

## Specifications

	VT-300E	VT-300M	VT-500E
IN/OUT Video Signal	NTSC, still picture	NTSC, moving picture	1125/60 (BTA S-001 Studio Spec.) still picture
External Sync	BBS	C. Sync, VBS	Tri-level bipolar Sync, or HD VD
Sampling Frequency	2 fsc, 3 fsc, 4 fsc, 13.5MHz	2 fsc, 3 fsc, 4 fsc, 13.5MHz	74.25MHz
Quantization	8 bit per pixel	8 bit per pixel	8 bit per pixel
Video Memory	NTSC Composite Video 3 frame, RGB composite 2 frame	48MB, 96MB (option)	1 frame of RGB (6MB)
Effective Picture Size	910(H) × 525(V)	910(H) × 525(V)	1920(H) × 1035(V)
Computer Interface	GP-IB	GP-IB, VME	GP-IB
Power Source	AC 100V, 0.4kHz	AC 100V, kVA	AC 100V, 1kVA
Dimension	480(W) × 249(H) × 578(D)mm	480(W) × 249(H) × 578(D)mm	480(W) × 249(H) × 578(D)mm

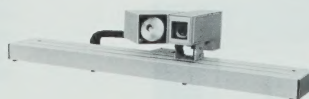
## Color Video Inspection System カラー印刷物監視システム TPM2000

## TPM2000



## System structure:

— CCD Camera, TV Monitor, Controller, Stroboscope and traverse mechanism.



## Description

The TPM2000 is a video inspection system for the printing press.

All WEB area which run at high speed can be monitored as the still picture on TV Monitor.

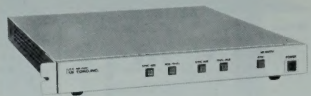
## 概要

高速で走行中の印刷物をストロボとCCDカラーカメラでとらえ、リアルタイムでモニタテレビに表示します。

カメラスライド機構により、ウェブ横方向、エンコーダにより版胴方向と全ウェブの監視が可能です。

印刷物のオンライン品質管理に最適です。

## Video Accessories 画像アクセサリ

**HM-7000**  
**HI-VISION MATRIX TRANSLATOR****Description**

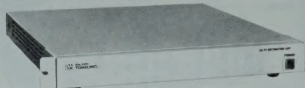
This high performance matrix translator makes conversions between YP<sub>B</sub>P<sub>R</sub> and GBR high-vision video GBR signals.

Two way conversions are done using the internal GBR → YP<sub>B</sub>P<sub>R</sub> and YP<sub>B</sub>P<sub>R</sub> → GBR circuitry. The ON/OFF function of the Matrix conversion and synchronizing signal equipped can be controlled either by switches on the front panel or by remote methods.

**概要**

ハイビジョン方式の映像信号であるGBRとYP<sub>B</sub>P<sub>R</sub>間の変換を行う高性能のマトリックス変換器です。

GBR→YP<sub>B</sub>P<sub>R</sub>及びYP<sub>B</sub>P<sub>R</sub>→GBRの各回路を内蔵しており、相互変換が可能です。マトリックス変換及び同期信号付加のON/OFFがフロントパネルのスイッチ又はリモートによりコントロールできます。

**HDA-5000**  
**HDTV VIDEO DISTRIBUTION AMPLIFIER****Description**

This high performance video distribution amplifier can be used for a wide range of image signals including HDTV, PAL, SECAM, and NTSC.

With steady frequency characteristics up to approximately 50MHz, it can be adapted for use as studio equipment. Up to 3 inputs (3CH x 1) and 9 outputs (3CH x 3) can be used at one time.

**概要**

HDTV、PAL、SECAM及びNTSC等の広範囲な映像信号に使用できる高性能ビデオ分配器です。50MHz程度まで平坦な周波数特性を持っており、スタジオ機器等への応用が可能です。

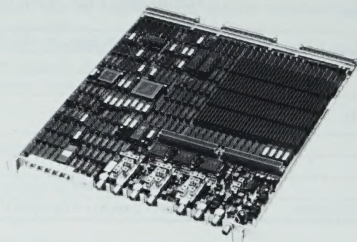
3入力(3CH×1)、9出力(3CH×3)まで利用できます。

**TEN-6010N**  
**NTSC COLOR ENCODER****Description**

This color encoder converts the NTSC mode Y<sub>R</sub>Y<sub>B</sub> primary color signals into a composite video signal. The input synchronizing signal can be used either combined with component signal or an external synchronizing signal. 2-composite video signal outputs have also been provided.

**概要**

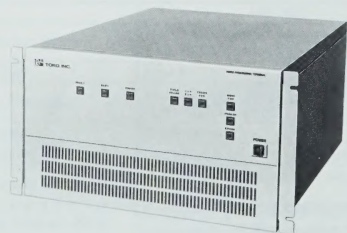
NTSC方式のY<sub>R</sub>Y<sub>B</sub>の原色信号を複合映像信号に変換するカラーエンコーダです。入力同期信号は輝度信号に複合されたもの、あるいは外部同期信号が使用できます。2系統の複合映像信号出力が用意されています。

**HDTV Frame Buffer Board** HDTVフレームバッファボード**HDF-2000****Description**

The HDTV Frame Buffer Board is a triple-height VME bus board. A 16MB video memory is mounted on the board. It is capable of storing 2 HDTV color screens and 2 overlay displays. Installed with Sun workstations, the HDTV Frame Buffer Board provides high-definition images in full colors.

**概要**

HDTVフレームバッファボードは、トリプルハイトサイズのVME busボードです。オンボードに16MBのビデオメモリを搭載し、ハイビジョンRGBカラー画像及びオーバーレイの画像をそれぞれ2画面記憶することができます。SUNワークステーションに実装し、ハイビジョン映像をフルカラーで表示します。

**Digital VTR (D-1) Buffer** デジタルVTR(D-1)バッファ**VIF-1000****Description**

The VIF-1000 is an interface which connects a digital VTR (D-1 Standard) to the host computer.

The VIF-1000 can store image data of one second in its standard 48MB video memory. It also has an image output terminal and is capable of monitoring image data. Since it is capable of remote controlling digital VTRs under control from the host computer, you can readily do editing, recording and replaying on-line.

**概要**

VIF-1000は、デジタルVTR(D-1規格)をホストコンピュータに接続するためのインタフェース装置です。

ビデオメモリとして48MBを標準装備しており、約1秒の画像データを蓄積することができます。映像出力端子も用意されており、画像データのモニタが可能です。ホストコンピュータの指令で、デジタルVTRをリモート制御しますので、編集・録画・再生などが、オンラインで自由に行えます。





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